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# ORAL HEALTH

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# ORAL HEALTH

A JOURNAL THAT STANDS FOR THE "OUNCE OF PREVENTION," AS WELL AS THE "POUND OF CURE"

VOL. 13

TORONTO, JANUARY, 1923

No. 1

## How a Dentist Might Proceed in Endeavoring to Start Dental Service in the Schools of his Community.

EDMUND A. GRANT, D.D.S., TORONTO. DIRECTOR DENTAL SERVICES, DEPARTMENT PUBLIC HEALTH.

THE following has been prepared in response to many requests from different parts of the country for a brief outline of the work, organization and authority for establishment of a dental service for school children. It is hoped that the outline presented herewith will be of assistance to the dentist who desires to serve his community in extending the recognized benefits of dentistry to school children.

*First:* Secure permission from the local school board to make a survey of the children to ascertain condition of children's mouths, percentage requiring treatment, etc.

*Second:* From the figures thus secured, make representations to the school board, other public bodies and influential citizens, such as clergymen, physicians, teachers, etc., as to the urgent need for dental treatment.

*Third:* In large centres, it is considered most desirable that the dental service in schools be placed under the Health Department of the municipality, so that it may be co-ordinated with other health and child welfare activities. In towns and rural communities where the Health Department is not so highly organized, the school board is considered the best agency to work under. The following extracts from the Provincial statutes laid down for the Department of Education, give the authority for the establishing of dental service by a school board, and also the special regulations for the City of Toronto state how such a service may be established and conducted by a Health Department:

**REGULATIONS OF THE PUBLIC AND SEPARATE SCHOOLS.  
REVISED—1915.**

**EXTRACTS FROM THE STATUTES.**

**SCHOOL DENTAL INSPECTION.**

**Organization of Boards and Committees.**

14.—(1) Where provision has been made for the free treatment of the teeth of pupils whose parents or guardians are unable to pay therefor, one School Board, or a number of School Boards, acting either by themselves or in conjunction with other local associations approved for this purpose by the Minister, may by resolution adopt a system of school dental inspection.

(2) Where a number of School Boards, acting either by themselves or in conjunction with other local organizations approved for this purpose by the Minister, so decide, the inspection shall be under the charge of a Committee thereof, to be known as a School Dental Inspection Committee, and to consist of as many members of each School Board and the other local organizations concerned as they may mutually determine.

**Qualifications of Staffs.**

15.—(1) The dental inspection shall be carried on by the Board or the Committee, under the Regulations herein prescribed, by one or more officers appointed by such Board or Committee, who shall be known as School Dental Officers, and who shall be duly qualified dental surgeons of, when practicable, not less than two years' experience in the practice of their profession.

(2) When more School Dental Officers than one are appointed, one may be designated, by the Board or the Committee, Chief School Dental Officer, and, subject to the Regulations, he may be given such oversight of the duties of the others as it may determine.

(3) In lieu of the organization provided for in 14 and 15 (1) and (2) above, the School Board or the Committee provided for in Regulation 7 may appoint a School Dental Officer or Officers who shall be subject to the general oversight of the School Medical Officer, as limited by the Regulations below.

**Expenses.**

16.—(1) When the school dental inspection is conducted by a School Board, the cost thereof shall be included in that of the maintenance of the schools, and shall be provided for in the same manner.

(2) When the school dental inspection is conducted by a Committee, the cost of maintenance to be borne by each of the Boards and other local organizations represented thereon shall be settled by mutual agreement among the said Boards and organizations, and in the case of the School Boards it shall be included in the cost of the maintenance of the school, and be provided for in the same manner.

**Inspection.**

17.—(1) Subject to the approval of the Principal, the inspection shall be made in the classroom, or, for special examination, in a suitable room or other part of the building where no other pupils are present.

(2) The Board or the Committee may instal in a room suitable for this purpose in one or more of its school buildings a dental chair for the examination of the pupils' teeth.

(3) On the report of the Principal that the parent or guardian has neglected to comply with the terms of the notice provided for in 18 (4) below, the Board shall take such action as it may deem expedient.

(4) Subject to the Regulations and the approval of the Minister, the School Board or the Committee may pass by-laws defining the duties of the School Dental Officer Staffs, and making provision for the carrying on of the work of dental inspection.

**Duties of School Dental Officer Staffs.**

18.—(1) In such of his duties as affect the general organization and management of the schools, the School Dental Officer shall be subject to the authority of the School Inspector or the local Chief or Senior School Inspector, as the case may be, or of the Principal of the school when, owing to other inspectional duties, the School Inspector is not accessible.

(2) Subject to the approval of the Principal, the inspection shall be made in the classroom, and, for special examination, in a suitable room or other part of the building where no other pupils are present.

(3) (a) Once every half-year, and at such other times as the School Board or the Committee may direct, the School Dental Officer shall make an examination of the teeth of all the pupils attending the school or schools.

(b) The first half-year's visit shall be made at as early a date as is practicable.

(4) When a member of the School Dental Officer Staff reports that the teeth of a pupil require dental attention, notice of the facts shall be sent to the parent or guardian through the Principal, and it shall be the duty of such parent or guardian to have the case duly attended to.

(5) At the close of the second school half-year the School Dental Officer shall make a written report on the general condition of the teeth of the pupils to the School Board or the Committee, as the case may be. In such report he shall make recommendations when, in his judgment, action should be taken by the Board or Committee.

SPECIAL REGULATIONS FOR THE MEDICAL AND DENTAL INSPECTION OF THE PUBLIC SCHOOLS FOR THE CITY OF TORONTO.

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Under Section 32a, of 1917, of the Public Health Act.

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ORGANIZATION AND QUALIFICATIONS OF THE STAFF.

(1) The school medical and dental inspectional staff shall consist of:

(a) A medical officer of health;

(b) An adequate number of assistant school medical officers, who shall be legally qualified practitioners of not less than two years' experience in the practice of their profession;

(c) School nurses, who shall be graduates of reputable training schools for nurses; and,

(d) School dental officers, who shall be duly qualified dental surgeons of at least two years' experience in the practice of their profession.

(2) The officers specified in (1) (b), (c) and (d) above shall be appointed by the Board of Health, on the recommendation of the Medical Officer of Health.

INSPECTION.

(1) The Board of Health shall determine how often the members of the inspectional staff shall visit the schools; but without the sanction of the Minister, the number of such visits in the case of the medical inspection shall not be less than one a week.

(2) The hours of work of the members of the inspectional staff shall be determined by the Board of Health, but shall be during the regular school hours, except in the case of the school nurses when home-visiting may make such hours impracticable; but said Board may arrange for additional home-visiting on Saturdays.

(3) (a) Subject to the approval of the principal of the school concerned, the medical and dental inspection shall be made in the classroom, and for special examination, in a suitable room or other part of the building where no other pupils are present.

(b) Subject to the approval of the Board of Education, the Board of Health may install in a suitable classroom in each of the school buildings, a dental chair, for the examination of the pupils' teeth, and the treatment of the teeth of children of the indigent.

(4) The cost of the school medical and dental inspection shall be defrayed by the Board of Health, and shall be provided for in the same manner as the funds for its other purposes.

## DUTIES OF THE SCHOOL DENTAL INSPECTIONAL STAFF.

(1) On the report of the principal to the Medical Officer of Health that the parent or guardian has neglected to comply with the terms of the notice provided for in 5 (3) below, said officer shall take such action as it may be authorized under the regulations or by direction of the Board of Health.

(2) (a) Once every year, and at such other times as the Medical Officer of Health may direct, the school dental officer shall make an examination of the teeth of all the pupils attending the schools.

(b) This inspection shall be made at as early a date as is practicable.

(3) When the school dental officer in charge reports that the teeth of a pupil require dental attention, notice of the fact shall be sent to the parent or guardian through the principal, and it shall be the duty of such parent or guardian to have the case duly attended to.

(4) At the close of the school year, each school dental officer in the schools under his charge, shall make a written report to the Medical Officer of Health on the general condition of the teeth of the pupils. In such report the school dental officer shall make recommendations, when, in his judgment, action should be taken by the Board of Health.

## REPEAL OF REGULATIONS.

All the regulations of the Department of Education in regard to medical and dental inspection that are inconsistent with the foregoing regulations are hereby rescinded so far as they concern the medical and dental inspection of the Public Schools of the City of Toronto.

August, 1917.

## METHOD OF CONDUCTING DENTAL INSPECTION OR SURVEY.

It will be noticed from the statutes that only examination is compulsory for the children. Before any treatment can be given, the parents must be notified and their permission secured in writing, which gives legal consent. In notifying the parents, they should always be urged to take the child to their family dentist. If, for financial or other reasons, they are unable to do this, they sign the card requesting treatment. The examination is most quickly conducted in the classroom. Wooden tongue depressors may be used, or mouth mirrors and explorers in an alcohol bath. An assistant should record the results of the examination on a duplicate form, the original to be given to the school nurse for follow-up purposes, and the carbon copy given

to the child to take home to its parents. Suitable forms, in booklets of 50, can be secured from the Ontario Department of Education, or the Department of Public Health, Toronto. When all the children in the room have been examined, the dentist should give them a 15-minute talk on the care of the mouth and teeth. The dentist should devote all his time to the examination and the talk, leaving all clerical work to the assistant. In this way, four or five classrooms may be examined in a school morning.

### EQUIPMENT FOR SCHOOL DENTAL CLINICS.

The following list is suggested as a standard equipment, containing all the essentials necessary for the treatment of children's teeth. Estimates of cost are not given, as these vary from time to time, and also because of the variation in cost through selection of innumerable different types of permanent equipment, ranging all the way from a portable chair, with hand spittoon and foot engine, to an S. S. White's child's chair, with unit stand and full electrical equipment. However, equipment purchased for use in a public service of this kind should be secured at wholesale rates.

#### TABLE OF STANDARD EQUIPMENT FOR SCHOOL DENTAL CLINICS.

##### Permanent Equipment.

- Dental chair.—Various types, from portable to S.S.W. child's chair, which is ideal for the purpose.
- Electric dental engine.
- Bracket table.
- Fountain spittoon.
- Electric sterilizer.
- Dental cabinet.
- Sterilizer table stand.
- Sanican.
- Dispenser for paper cups (not supplied when fountain is equipped with a bubbler).
- Electric water heater for syringe glass.
- Straight handpiece for engine. State whether Doriot or No. 7 Slip-Joint.
- Right Angle handpiece for engine. State whether Doriot or No. 7 Slip-Joint.
- Liquid soap dispenser.
- Wall mirror.

##### Instrument Equipment.

##### Cutting Instruments.

- 1 Chisel, L.H., No. 48.
- 2 Chisels, L.H. Black, Nos. 82 and 84.
- 4 Excavators, L.H., Darby-Perry, one each of Nos. 11, 12, 21, 22.
- 7 Instruments, L.H. Black, one each of Nos. 3, 49, 50, 63, 64, 65, 66.
- 1 Excavator, D.E., No. 19.

##### Scalers.

- 2 Right and left scalers, Nos. 33 and 34.
- 1 Sickle-shaped scaler, Ideal B.

##### Explorers.

- 2 Double-end explorers, Nos. 2 and 5, both double-end.
- 3 Pairs college pliers, No. 11.
- 6 Mouth mirrors, C.S., boilable.
- 6 Handles, C.S., for mouth mirrors.

##### Plastic and Filling Instruments.

- 2 Burnishers, L.H., Nos. 2, 34.
- Dr. Smith's D.F. instrument.
- 1 Burnisher, L.H., Caulk J.
- 2 Frahm carvers, R. & L., 90 deg.
- 2 Amalgam Instruments, Nos. 39, 41.
- 2 Plastic instruments, Woodson, Nos. 2 and 3.
- 1 Amalgam carrier.
- 1 Cement spatula, No. 24.

**Extracting Instruments.**

- 1 Upper universal root forcep, English pattern.
- 1 Lower universal root forcep English pattern.
- 1 Lancet, Volland.

**Sundries.**

- 1 Water syringe, all metal, self-filling.
- 1 Hypodermic syringe, Imperial No. 3.
- 1 Bardet hypodermic sterilizer stand, all glass.
- 1 Chip blower.
- 1 Arkansas stone, in wooden box.
- 1 Cotton holder, metal.
- 1 Waste cotton receiver, J. & J. pattern.
- 200 Cartons for receiver, J. & J. pattern.
- 1 Alcohol lamp, glass.
- 1 Pair rubber dam clamp forceps.
- 1 Rubber dam punch.
- 2 Rubber dam clamps, Ivory, Nos. 2a and 56.
- 1 Wizard rubber dam holder.
- 1 Pinafore holder, all metal.
- 1 Mortar and pestle, glass for amalgam.
- 1 Mercury holder, No. 3.
- 2 Glass medicament holders or dappen glasses.
- 4 Cement slabs, glass.
- 1 Sandpaper disk mandrel, Morgan Maxfield.
- 6 Mandrels, No. 303.
- 1 Wax spatula, No. 5, for heating copper amalgam.
- 6 Broach holders, metal.
- 1 Ivory matrix retainer, No. 1.
- 1 Doz. bands for ivory matrix retainer, No. 1.
- 1 Saliva ejector, metal.
- 1 Pair scissors, small straight, pointed ends, 5 inch.
- Dressing pliers, 9", for lifting instruments out of sterilizer.

**Supplies.**

- 1 Gross of burs. In ordering state whether for straight or right angle handpiece.
  - Round—sizes 2, 3, 4, 6, 8.
  - Inverted cone—sizes 34, 35, 36, 37.
  - Fissure burs—sizes 557, 558, 559.
- Pulp canal broaches, smooth or barbed. State whether fine, medium, large or assorted.
- 200 Lilly paper cups (where bubbler is not supplied).
- 1 lb. Floated pumice powder.
- 1/2 Gross tooth brushes, Abbott's Porte Polisher, mandrel mounted.
- 1 Box wood points, for Porte-Polisher.
- Absorbent cotton rolls, 1 1/2", Nos. 2 and 3, assorted.
- Aseptic dental napkins, 6" x 6", 500 in a box.
- Absorbent cotton, 1 lb. roll.
- 1 Spool floss silk.
- 1 Box finishing strips, assorted.
- 1 Box 500 assorted sandpaper disks.
- 1 Pkg. orangewood sticks.
- 1 Bottle engine lubricating oil and can.
- 1 Box celluloid strips.
- Hypodermic Needles.

**Filling Materials.**

- 5 Oz. alloy.
- 1 Lb. mercury.
- 1 Pkg. cement, containing 6 bottles powder and 6 bottles liquid, assorted.
- 3 Oz. copper amalgam.
- 2 Pkgs. temporary cement.
- 3 Pkgs. Caulk's temporary stopping.
- 1 Pkg. carbol eugenol.
- 1 Pkg. Ox Para.
- 1 Bottle arsenic devitalizing fibre.
- 1 Pkg. gutta percha points.

**Drugs.**

- Local anaesthetic tablets E.
- Ringer tablets.
- Distilled water.
- Dissolving cup or test tubes, as preferred.
- Liquid soap.
- 2 Oz. cloves.
- 2 Oz. creosote
- 2 Oz. campho-phenique.
- 2 Oz. trikresol.
- 4 Oz. formalin.
- 2 Oz. phenol.
- 4 Oz. chloroform.
- 4 Oz. peroxide.
- 2 Oz. H2. SO4.

- 4 Oz. alcohol.
- 1 Oz. aromatic sulphuric.
- 1 Oz. aconite, Fleming.
- 1 Oz. iodine, Churchill's.
- 1 Oz. eucalyptol.
- $\frac{1}{2}$  Lb. soda bicarb.
- 1 Oz. silver nitrate.
- 1 Lb. pumice.
- 3 Oz. sandarac.
- $\frac{1}{2}$  Oz. trichloroacetic acid.
- 2 Oz. aromatic ammonia.
- 4 Oz. aq. ammonia Fort.
- 2 Oz. common salt.

**Additional Equipment in Dental Centre.**

- 1 Dentist's in and out card.
- 1 Filing box and cover, 3 x 5.
- 2 Sets Guides, alphabet, 25 div. (Coll.).
- 1 Hamper, for soiled towels.
- 1 Bubblers.
- 1 Waste basket.
- 1 Ink bottle.
- 1 Piece pen points.
- 1 Pen tray.
- 2 Pen holders.
- 2 Pencils.
- 1 Blotter (large).
- 2 Reappointment cards (come back).
- 1 Bdle. Appointment Cards (buff).
- 1 Bdle. 25 extraction clinic daily reports (White), No. 19a.
- Dentist's daily report book.
- 2 Doz. red tags for arsenic treatments.
- 4 Bldes. 50 (P.C.) Friday p.m. post card reports No. 33B.
- 6 Pkgs. envelopes (white).
- 1 Bdle. 50 envelopes (brown), stamped and addressed to R. & S.
- 4 Bldes. 100 paper table napkins.
- 4 Dentists' gowns.
- 4 Assistants' gowns.
- 2 Doz. hand towels.
- 1 Bdle. 50 appointment cards (buff), No. 18a extraction clinic.
- 1 Pad store requisition forms.
- 1 Pad purchase requisition forms.
- 1 Pad receiving reports.
- 1 Bdle. 50 envelopes "To school nurse."
- 1 Pad laundry slips.
- 1 Lb. soda bicarbonate.
- 1 Yard cheese cloth.
- 1 Wash duster.
- 2 Paper towels.
- 1 Bon Ami (shaker).
- 1 Black clip file.

**ROUTINE METHODS OF CONDUCTING CLINICS.**

**DENTAL EXAMINATIONS.**

Every pupil is examined by a dentist once a year.

At the time of this examination the dentist records upon the history card the condition of each child's mouth, with reference to oral cleanliness, roughly classifying them as: 1, excellent. 2, good. 3, fair. 4, poor.

The defects discovered by the dentist are noted upon a duplicate carbon form. The actual defect and the individual tooth affected should be recorded.

The card form is sent to the parent urging treatment by family dentist, and the original slip is retained by the nurse. If a private dentist treats the case, he is expected to sign the back of the card and to return it, by the child, to the school nurse, who destroys her tracer and notes termination.

If parent is unable to have work done, the reason is given, and the nurse acts accordingly.

## SCHOOL DENTAL CLINIC TREATMENT.

If a parent claims to be unable to afford private treatment, the nurse investigates, and, if satisfied, has the parent make application for dental clinic treatment upon "consent" form, which the nurse endorses. An appointment is made for the child, and a memo of the time and place is written across the bottom of the consent card, and the card is given to the child. This card should have, on its reverse side, a chart of the mouth and provision for entering up particulars of work done.

The child presents this card to the dental clinic. The clinic dentist accepts it as his warrant for doing the work—parent's consent and nurse's endorsement—and records upon the back of it the work that he does for the child, retaining it in his file as a permanent record.

The dental clinic concerns itself only with working for the children that present themselves for treatment. The making of new appointments, and seeing that the children keep them, is entirely the business of the school nurse.

The method of making appointments is as follows:

Each school is allotted a certain number of vacancies at a certain clinic, on a certain day of each week.

Each school nurse has a tickler file, consisting of a set of 1-31 day guides in the 3 x 5 tray, which contains her duplicate of notification, exclusions, etc.

After each clinic a report is sent to each school from which patients came that day, notifying the school nurse of attendance, completions, and reappointments from her school. (See section on "Dental Clinic Daily Reports.")

When a nurse makes an appointment for a child to attend a dental clinic, she takes the duplicate of the notification of dental defect from its place in the alphabetical file and places it in the tickler of the appropriate date.

On receipt of the report from the clinic, the nurse checks the attendances reported against the slips in the "tickler," and destroys the slips of cases completed. (Noting termination on history card and daily report.) She moves forward the slips of cases given reappointments by the dentists, and proceeds to make new appointments for her next clinic, to fill up the remaining vacancies allotted to her school.

When a clinic dentist wishes a pupil to return for further treatment he enters a reappointment date on the daily report.

A daily report is made for each clinic by the dental assistant, if present, or by the dentist. The names of the schools contributing patients to the clinic on the day in question are entered at the top of the perforated sections on the left. The names of the children attending clinic are entered under their respective schools, one name to a line,

and the actual work is noted against each name in the section at the right-hand side.

Periodically, these reports are tabulated, attendance and completions, by schools, and work done by clinics. The perforated slips reporting attendance, etc., are then separated and distributed to their respective school nurses. They are taken by the nurses to their respective schools, and become the basis for appointments, reappointments, and terminations.

The work section at the right is retained by the chief dental officer as the clinic report. Copies of all these forms may be obtained from Department of Public Health, Toronto.

Eight to ten children can be treated in a clinic each half-day of school time, endeavoring, if possible, to carry each case through to completion. One half-day per week should be devoted to the treatment of children of pre-school age.

#### HOW MAY INSTRUCTION IN ORAL HYGIENE BE GIVEN IN SCHOOLS.

1. By the *Teacher*.—In conjunction with text book on Physiology and Hygiene, imparting knowledge on the structures of the mouth, their importance and care. Proper methods of brushing the teeth, followed up by a system of daily inspection or questioning to check up the care taken by the children to keep their mouths clean. This could be stimulated by a system of rewards or merit marks for those who have clean mouths.

It is, therefore, important that the teacher herself be correctly instructed in the principles of oral hygiene.

2. By the *School Physician*.—At the time of complete physical examination of the child.

3. By the *School Nurse*.—Through classroom talks, tooth-brush drills, and visits to the homes.

4. By the *Examining Dentist*.—At the time of the annual survey, through classroom talks. This is the very best time to make a marked impression on the mind of the child whose mouth has just been examined and defects pointed out.

5. By the *Clinic Dentist*.—Direct advice to the children as they come under his care.

6. By *Distribution of Pamphlets*.—On the care of the mouth and teeth.

7. By *Exhibition of Posters in the Schools*.—There are at present a set of about thirty in use in the Toronto Public Schools, which were prepared by the late Dr. Doherty. There are also a great variety of these prepared by different child welfare associations. A splendid series of posters in colors are issued by the "Child Welfare Association.

370 Seventh Street, New York City." To be effective, they should be artistic, preferably illustrated in colors, with short, terse sentences. They should also be changed frequently. A picture that hangs a long time in one place is never looked at.

8. *In Art Classes.*—A new experiment is now being carried on in the Toronto Public School art classes. The children are taught to copy and color oral hygiene posters.

9. Lectures by dentists to mothers' meetings. Lectures by dentists to teachers and nurses.

#### USE AND DUTIES OF DENTAL ASSISTANT.

Dental assistants should report for duty at the school clinics at 8.45 a.m., and remain there till 12.30. If clinic is conducted in afternoons, should be on duty from 1.15 to 4 p.m.

Should wear white gown and cap.

Report daily on arrival to the school nurse.

If absent more than two half days, medical certificate should be furnished.

On arrival, electric sterilizer should be filled with water and made ready for use. Floors should be swept and room dusted.

Receive patients and place first child in chair in readiness for the dentist on his arrival.

In order to allow the dentist to devote all his time to the operative work, the assistant should assume all clerical work and management of the children; receive cards from children, enter up on them and on report form the work done; notify the nurse of completions and arrange for necessary reappointments. Keep records of equipment and supplies on hand, and order whatever is necessary to replenish supplies, or replace worn or broken equipment.

Assist the dentist at the chair; mixing filling materials, sterilizing instruments, etc.

Before leaving, all instruments should be sterilized, and everything put away.

In a public service of this kind, a dental assistant is an economical necessity.

*Salary of Dentist.*—Half-time service secures the best operators, and is, therefore, preferable. \$150.00 per month is suggested as a minimum salary for a dentist devoting six half days per week to this service.

# Sensitive Dentine

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W. C. SMITH, D.D.S., *Toronto.*

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**S**ENSITIVE dentine is a source of fear to every patient and a constant problem to the conscientious dentist.

Dentine has no nerve structure. The nerve endings of the pulp are in physiological connection with the odontoblasts which have their prolongations in the dentine and known as dentinal fibrils. Each fibril is composed of the same nuclein substance as its odontoblastic cell of which it is an extension. Hence upon irritating a nerve fibril an impulse is conveyed to the odontoblast of which it is an extension and this communication with its nerve ending which communicates with the brain is recorded as pain. A nerve fibril, when not supplied with its protection provided by nature, becomes irritated and sensitive whether from mechanical or clinical means.

The treatment of sensitive dentine becomes a real problem in every operation on a vital tooth, and because of this reality there has been an earnest search for a remedy, to the relief of all interested. Many obtundants have been advocated and for a time seemed to have happy results, but the slight relief resulting has not compensated for the effort expended, time required for tedious application, with ultimate disappointment to an expectant patient and to the chagrin of the operator. Local application, though most efficient, often proves injurious in a permanent way even to devitalization, and usually are not observed until several months after. General anaesthesia is impractical for individual operations, though may be considered for exceptional cases. Local and conduction anaesthesia are each required on occasion, but the energy of patient and of operator expended at operation, with pain and inconvenience attending and following operation, removes them from the usual treatment of sensitive dentine. The search for a cure-all of painful operations has engaged every generation of dentists and, while progress has been made, no operator will say that his chief satisfaction has been in resorting to drugs.

Sharp instruments only should be used. It takes a long time to believe that a sharp instrument cuts the dentinal fibril clean and almost painlessly when compared with one blunt, irregular and carelessly kept. Dull instruments can only crush and tear away the fibril with much discomfort—a sharp razor severs but a dull one pulls apart. Skilful operators will sharpen new instruments on receiving them and will keep an Arkansas stone so convenient that a fresh edge will be restored several times daily to those most used. Patients are quick to discern and do appreciate this freshening of

cutting blades. Old burs with dull blades produce the same injuries and should not be left about the cabinet. For testing the edge of an instrument, students ought early to develop the habit of pricking the epidermis of the thumb or finger in conveying each cutting instrument from the cabinet, and if there be no "catching" response it should be touched to the stone before use.

A knowledge of dental anatomy works for the avoiding of much pain. Aware of the varying depths of enamel enables an operator to at first avoid the dentine when extending a cavity. Friction produced in removing enamel with stone or bur is often prolonged and if the dentine be included at the same time much pain will result. But if the less resisting dentine be removed after the enamel, sensation will be of short duration. Undermining a given area, with sharp inverted cones, severs the fibrillae, rendering much work painless. Also in the removing of carious material with sharp spoons, knowing the exact location of the pulp, all work is confined to the area surrounding the pulp by lifting the layers of decayed tissue toward the cavity margin, and when this is being completed that decalcified tissue over the pulp will almost entirely have been removed at the same time. By drawing, not pushing, a broad sharp spoon immediately over a nearly exposed pulp will dislodge any remaining tissue necessary to be removed.

But every operator occasionally employs some therapeutic agents of the many so classified for sensitive dentine. Paraform combined with cocain and cloves and sealed in a cavity is helpful. In shallow cavities and when little paraform is in contact with the dentine the treatment may be left for weeks, while in deep cavities, when combined with cocain and cloves it should be removed in a few days. Often good results are obtained by dehydrating with alcohol and hot air before applying oil of cloves and pressing the pledget with a hot instrument. Very sensitive dentine in permanent teeth of young children may often be painlessly removed by a single injection of local anaesthetic along the apices of the teeth to be operated upon and massaging the gum for five minutes after injection for forcing the anaesthetic through the porous compact bony tissue. Occasionally, for continued cutting or grinding of dentine, intraosseous and conduction anaesthesia are valuable and every operator should familiarize himself with their technique. In shallow cavities near the gum ethyl chloride spray is valuable. Having first filled the cavity with temporary stopping, and spraying the tooth tissue round about, the stopping may be removed and spray directed into the cavity without any appreciable pain. But the pain of sensitive dentine and continued fear of the patient must be met by the uninterrupted conduct of the person of the dentist. Every patient must be sympathetically studied and accepted for just what they are

and not as we would have them, our work being not the treatment of different teeth but differing persons. Earnestly appreciating their situation, whether it be of pain or fear of it, will quickly assist them in their efforts beyond their own expectation. One succeeds in diverting attention by a skilful telling of a story or assuages fear by running the burs on his own and then the patient's finger. Movements may be hastily made outside the mouth but only the development of the gentle touch will be sufficient in oral work, always convincing the patient you are working with the utmost care. A quiet word during work is often a real support showing your concern. How often is the remark made of a dentist, "O yes, he hurts, but he is so kind and careful."

The effects of sensitive dentine are a challenge to personality fraught of an earnest sympathy whether expressed through proved aids or meeting weakness with a greater strength. The writer recently accompanied a patient in a consultation with a famous surgeon for a major operation. The nervous dread of the patient was met by a man of quiet, dignified mien, a sympathetic and honest hearing of symptoms, and a kindly and genuine interest in all his welfare. With knowledge that an operation would probably cost him his life, which it did, all fear was dispelled through the confidence inspired.

The demands of dentistry are upon the development of the whole man and are not satisfied by the application of lower motives.

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### "The Deciduous Teeth"\*

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BY ROSCOE A. DAY, SAN FRANCISCO, CALIF.

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THE lower jaw is a mould, so to speak, for the upper to conform upon, and has a tremendous influence upon its future growth. Its continuous operation of closing and locking within the upper jaw during mastication and other natural functions,—through its forces exerted in these functions,—exerts marked influence upon cell growth in the bones. In addition, muscular function in the oral cavity, and the forces of occlusion being normal, nature's intentions are not interrupted and the growth is beautiful, to say the least. But if, for any reason, these functions or occlusion are disturbed, the result of the abnormal pressure in the locking of the lower within the upper jaw becomes evident very quickly.

Whether it be due to local causes disturbing the mesio-distal, or bucco-lingual locking of the cusps of the teeth, or whether it be due to the interchanging from the deciduous teeth to their successors, the per-

\*Read before the California State Dental Association, June 20, 1921.

manent ones, it is a stage in the development of all deciduous mouths to be carefully observed and given immediate consideration and corrective treatment. In the transition from the deciduous period to the permanent one, we have to consider individual tooth position to a great extent, and any local or congenital influence that may be present.

We have first to take into consideration the lower incisal region. If arch growth has been normal, the area has not been disturbed, the proper spacing and separation of the deciduous teeth and sufficient growth between the area of the cuspids has taken place, and root absorption has been normal, permitting the permanent incisors to follow in their wake to a successful eruption, so much to the benefit of the individual. But if nature is interrupted in this area, attention should be given, the cause removed and assistance administered.

The deciduous incisors are much narrower in width and general outline compared to the permanent ones, which is in conjunction with nature's anatomical and featural balance of childhood,—hence natural arch growth to accommodate the permanent incisors upon eruption. If this does not take place, it means usually a disturbed alignment of the permanent incisors in the arches, whether or not the absorption of the deciduous incisors has been normal. They will, as a rule, erupt into a rotated position, as well as into a lingual or labial position, losing their mesio-distal contact and nature's process of natural mechanical stimuli. Non-absorption of the deciduous incisor roots means a similar condition, only that the permanent incisors will take a lingual position to the unabsorbed deciduous root, owing to lack of root absorption acting as a guide, as it were, to their mal-position, or else the permanent successors will remain in the alveoli, impacted, and in nature's endeavor to cause them to erupt they will become locked at such an angle that surgery has to be resorted to at a later period to assist them into an arch alignment. In such cases arch development is lacking, and osteoclastic function absent. In cases of that character, immediate removal of the non-absorbing deciduous incisors and arch development through artificial mechanical procedures are necessary. The effect of this unnatural condition will be reflected on the upper arch, and in such instances both arches will be in need of surgery and of artificial mechanical stimuli.

In early childhood, during playtime, etc., we have found that children are quite susceptible to accidents, causing the too early loss of some of the deciduous incisors, usually occurring in the upper arch, although sometimes in the lower. When this unfortunate occurrence takes place, it is something to be given serious consideration at once. If it applies to the upper arch, it immediately throws an extra burden upon the lower arch in trying to maintain the function of its moulding process to the upper, as the upper arch has lost its mesio-distal contact support and lip pressure in assisting nature's arch growth.

In such cases, observe the spacing and see that sufficient room re-

mains for the permanent successor to erupt; if not, apply mechanical assistance at this period and retain it until the permanent successor erupts. If it applies to the upper deciduous central, it may result in the impaction of the permanent central, or, if it erupts, it usually does so, lingually or labially, out of arch alignment, as well as a mesial shifting of the remaining teeth in the arch may take place, bilateral in character, more pronounced upon the side of the arch of the missing member. If the accident applies to the upper deciduous lateral, it may result in an impaction of the permanent lateral and arch collapse in the direction of least resistance, and also it has its reflex effect upon the lower arch. Any congenital incisal abnormality must be considered in the deciduous stage and acted upon with such judgment that conditions will be restored to normal if possible.

I feel that it is better procedure at this tender age, when such malformations present themselves and have developed to such an extent that development has been interrupted,—no matter what causes have brought about the abnormality,—to take into consideration the arch as an entirety and bring about a general arch development and occlusion establishment, through some form of mechanical stimuli, by placing the child under treatment by means of appliances to assist development to a degree corresponding to the age of the case in hand.

I may say that the earlier it is possible to do this, before too great a deciduous root absorption has taken place, the greater the effect of the mechanical stimuli on arch bone growth as a whole.

From the central and lateral area the next step in the interchanging from the deciduous to the permanent teeth is the molar and cuspid area. The incisors when erupting are assisted very pronouncedly by the tongue and lip muscles and also by a form created by the cuspids on either side acting as a guide, and a lesser amount of bone influence in their location and at their period of eruption, whereas between nine and one-half to twelve years of age, when the bicuspids succeed the deciduous molars and the permanent cuspids are erupted, there is in a way a greater danger to the process of eruption than in the earlier period, owing to the fact that there is greater bone density and more permanent teeth to take into consideration. Distally the first permanent molar having erupted and its occlusal locking influence (especially if mesial or distal to normal), and the second and third permanent molar follicles forcing their way into eruption in the arch, exerting a pressure (forward and downward, or upward, whether in the upper or lower arch), are further at work. Mesially the permanent incisors in both arches, with their character of occlusion at this period, as well as the muscular pressure exerted, and other natural functions, are likewise exerting their influence.

We will take the deciduous molar and cuspid area unilaterally. How wonderfully perfect nature's plan is in regard to anatomical arrangement. The deciduous molars with their dual functioning, first,

to create an ideal masticating surface for childhood up to the period of the establishment of the bicuspid and the permanent molar area, and secondly, to maintain sufficient spacing between the first permanent molar and the deciduous cuspid to permit of the easy eruption of the bicuspid and to act as a guide when in their proper place in the arches for the correct eruption of the first permanent molar and their normal occlusal locking, when no local interference exists.

Owing to the fact that these deciduous teeth are retained by nature longer in the arches with the deciduous cuspid, you can fully appreciate the importance of their care and what results when any of the members are destroyed through any accidental or pathological condition.

The lower first deciduous molar, as a rule, is the first to be lost, followed by the upper first deciduous molar, permitting the first bicuspid to erupt immediately in its wake. Nature's wonderful plan again in operation allows generous space for the bicuspid, owing to their mesio-distal width being less than that of their predecessors, as well as creates a greater space between the permanent lateral and itself, thus affording more area for the erupting permanent cuspid.

The next deciduous tooth in this area to be lost is usually the lower second deciduous molar, but this does not always follow, as it may be the deciduous cuspid instead. If so, it is very important to watch its eruption, as its allotted space may be diminished owing to the fact that the second deciduous molar is maintaining too great a space at this period of dentition. If the eruption of the cuspid takes place before the loss of the second deciduous molar, not enough space will be available, as nature's ideal intentions are that the second deciduous molar should be lost before the deciduous cuspid, so that a still greater space for the erupting permanent cuspid be gained, owing to the lessened mesio-distal width of the second bicuspid, and the normal occlusal locking of the cusps of the first bicuspid in the arch, creating and forcing to contact with its neighbor the second bicuspid, gaining a still greater area for the permanent cuspid to erupt into a normal position and occlusion.

Premature loss of either the first or second deciduous molar, whether pathological, accidental or otherwise, is a very serious matter, and has a pronounced effect upon arch development and tooth occlusion as an entirety, or individually, more pronounced when it takes place in the lower arch, disturbing the latter's influence upon the upper, as well as permitting the mesial or distal shifting of such permanent teeth as may be in the arches at this period.

The premature loss of the first deciduous molar in the lower arch permits of the distal and lingual movement of the permanent incisors and deciduous cuspid upon the lateral half of the arch, where the loss takes place, entirely disrupting the permanent incisal occlusion, creating an extensive overbite and elongation of both lower and upper

incisors. It will also permit of a mesial tipping movement of the second deciduous and first permanent molars, in some instances closing the space sufficiently to cause impaction of the first bicuspid or its eruption lingually or buccally out of arch alignment. Further, it may result in the early eruption of its successor in occlusion with the deciduous tooth of the opposing arch, unnatural in inclined plane relationship, as well as affecting the mesio-distal spacing in the arch.

The premature loss of the second deciduous molar in the lower arch may have the same effect upon arch development and occlusion as its neighbor, the first deciduous molar, and may bring about an impaction, premature or forced buccal or lingual eruption of its successor. The premature loss of one or both of these deciduous molars has its reflex effect upon the upper arch to a greater extent, especially if ignored and allowed to remain in its unnatural state up to the eruption of the permanent teeth of the upper arch. It permits, in many instances, the too early eruption of the bicuspid, upsetting nature's plan of mesio-distal spacing of the permanent dentition, and the inclined planes of the bicuspid will not properly lock or mesh occlusally with the opposing deciduous molars.

The premature loss of the deciduous molars in the upper arch, when the lower arch is not affected likewise, is perhaps not quite so disastrous to the future occlusion, owing to the fact that the moulding effect of the lower arch is still operative, but their premature loss may be the cause of the mesial locking of the first permanent molar with the lower, causing an unilateral or bilateral mal-occlusion of the entire arch at the completion of dentition. However, it may not extend mesially further than the cuspid, creating an impaction or lingual or buccal eruption of one or both bicuspids as well as reflecting upon the course of eruption of the second and third molars. In such instances corrective treatment should be applied and the occlusion and spacing established and retained up to the period of complete dentition.

These conditions should be given serious consideration whenever present, mechanics applied and proper occlusion established and arch development and spacing created to normal to permit the permanent dentition to function normally; lost space gained should be retained by some form of mechanical retainer until the permanent successors have erupted into their normal position and occlusion. The importance of this mechanical enlargement and retention in the lower arch, when the deciduous molars have been prematurely lost, is greater, owing to the moulding and guiding influence of the lower upon the upper jaw.

Non-absorption or prolonged retention of any of the deciduous molars may be equally disastrous to the future occlusion, the only advantage in such cases being the improbability of total or partial collapse of arch growth and occlusion; impaction of the permanent tooth follicles and eruptions out of arch alignment are here more frequent.

In the natural transition from the deciduous to the permanent area, the deciduous cuspid is usually the last to be lost of the twenty deciduous teeth, but as I have said before, it is not always true to form and may be shed before the second deciduous molar. In such instances the allotted space is not always equal to the greater width of the permanent cuspid and the latter has difficulty to erupt completely, there occurring loss of its mesio-distal contacts and axial rotation or again lingual or labial position out of arch alignment.

I do not believe that the cuspid area is always considered as seriously as it should be; it is, so to speak, the supporting line between the bicuspid, molar and incisal regions, carrying a tremendous influence upon their balance of relationship in regard to the total occlusion, and I wish to emphasize the importance of arch observation at that period of dentition. Its premature loss in the lower arch results in lack of mesial support of the deciduous and first permanent molars, allowing mesial shifting of these teeth, assisted by the natural forward arch growth plus the occlusion of the opposing teeth, whether it be an unilateral or a bilateral loss. It will permit of the distal and lingual shifting of the occlusion of the permanent incisors to the extent, at times, when the permanent lateral and first deciduous molars or first bicuspid are in contact, of a pronounced overbite and elongation of the permanent incisors and impaction of the permanent cuspid, or possibly its eruption lingually or labially in arch alignment and a disastrous effect upon the occlusion as a whole.

In the upper arch it may permit of the mesial movement, either unilateral or bilateral of the deciduous and first permanent molars to mal-occlusion, as well as allowing a collapse of the premaxillary or incisal region, causing the permanent incisors to shift distally on either side of the median arch line and throwing a greater load upon the lower permanent incisors and, in many instances, causing them to lose their contact support and rotate out of normal relationship with one another. In extreme conditions, resulting from this mishap, one or more of the upper permanent incisors will be shifted to an occlusion lingual to the lower permanent incisors, and the permanent cuspid usually erupts in a superficial labial impacted state, or, in some instances, it will be totally impacted.

Prolonged retention of the deciduous cuspids does not, as a rule, upset the occlusion as greatly as their premature loss. It results usually in a total impaction of the permanent cuspid, and the forces of eruption cause it to take some form of a freakish position in the arch. I may say that there are more impactions of the permanent cuspid than of any other succedaneous permanent tooth. Nature is many times a slacker in her osteoclastic functioning upon the deciduous cuspid root, causing the permanent cuspid to become lodged or locked among the roots of the other permanent teeth.

Nature, along with her other creations of bodily functions,

established a process, or function, to care for the oral cavity from the period of conception up to and inclusive of that of maturity. During this period she brings about, with her other wonderful developmental creations, the process of dentition,—first, the deciduous dentition and then the transition to the permanent dentition, and at this period she has created certain elements to bring about this function, and when they function normally and according to her natural plans of perfection as to type in all bodily things, I hardly believe we can improve upon her work by interference, unless there is a *physical* or local reason for so doing. If the arch growth and development are taking place normally and if proper spacing, permitting of alignment, normal locking, etc., upon eruption of the permanent teeth is taking place, and the deciduous occlusion is normal in every character, and the osteoclasts are doing their duty, I believe it better to allow nature every opportunity to complete her task as per her original intentions. But if for physical or local reasons nature is interrupted in her functions, it is then the duty of the operator to assist nature to function more normally by removal of such deciduous teeth as are necessary at the proper period and age, etc., and which are interfering with the permanent dentition and their future normal occlusion. You have to be governed to a greater extent by the physical characteristics of the child, unless local conditions demand operative procedure owing to the existence of pathological or abnormal conditions.

Do not attempt to remove these deciduous teeth in healthy mouths unless the succeeding permanent units can be locally observed, or with the use of the radiogram, to know for certain that permanent successors are present, or else you may be doing a great harm to the future arch growth and occlusion, with a result that will demand mechanical operative procedure to correct it in the permanent dentition. It is, in my opinion, better procedure to retain a deciduous member in the arch as long as possible in the permanent dentition in the absence of a successor, knowing that the mesio-distal diameter is not in perfect keeping with its associates, rather than to have to resort to some mechanical form of replacement.—*The Pacific Gazette*.

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## Dominion Dental Council Examination Results —September, 1922

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### PASSED IN OPERATIVE DENTISTRY (PAPER).

Barnes, David  
Hamilton, C. W.

Kerr, G. A.  
Kerr, W. J.

### PASSED IN PROSTHETIC DENTISTRY (PAPER).

Barnes, David  
Hamilton, C. W.

Kerr, G. A.  
Kerr, W. J.

## PASSED IN ANAESTHETICS.

Barnes, David  
Hamilton, C. W.

Kerr, G. A.  
Kerr, W. J.

## PASSED IN MATERIA MEDICA AND THERAPEUTICS.

Atkinson, W.  
Allen, E. F.  
Barnes, David  
Beattie, P. A.  
Bird, S. R.  
Blanchard, F. N.  
Bradford, R. A.  
Calkin, V. C.  
Clements, R. W.  
Clermont, A.  
Coutts, W. M.  
Dinniwell, R. A.

Flora, W. S.  
Florian, S. D.  
Graham, J. R.  
Hamilton, C. W.  
Heather, M. P.  
Heal, H. H.  
Hogan, M. F.  
Jackson, J. E.  
Kay, L. D.  
Mann, S. C.  
Mitton, G. I.  
Miles, R. L.

MacDougall, J. L.  
MacLean, F. J.  
McIntyre, H. A.  
McIsaac, S. G.  
Nelson, C. A.  
Simon, M. L.  
Trueman, Wm. L.  
Ward, W. C.  
Wagner, G. W.  
Westlake, L. J.  
Wilson, R. L.  
Woods, A. R.

## PASSED IN ORTHODONTIA.

Bagnall, S.  
Barnes, David

Hamilton, C. W.  
Kerr, G. A.

## PASSED IN MEDICINE AND SURGERY.

Akins, S. C.  
Barnes, David

Hamilton, C. W.  
Kerr, G. A.

Wagner, G. W.

## PASSED IN PATHOLOGY AND BACTERIOLOGY.

Barnes, David  
Bird, S. R.  
Blanchard, F. M.  
Calkin, V. C.  
Coutts, W. M.

Dinniwell, R. A.  
Florian, S. D.  
Hamilton, C. W.  
Heal, H. H.  
Hogan, M. F.

Kerr, G. A.  
McIsaac, S. G.  
Towner, C. J.  
Westlake, L. J.

## PASSED IN JURISPRUDENCE AND ETHICS.

Hamilton, C. W.

Kerr, G. A.

## PASSED IN PHYSICS AND CHEMISTRY.

Akins, S. C.  
Baker, A. L.  
Barber, J. L. C.  
Bisnett, A. M.  
Bradford, R. A.  
Bristow, R. W.  
Campbell, R. H. M.  
Dodds, R. E.  
Donald, S. K.  
Florian, S. D.  
Foote, J. C.  
Gardiner, W. O.  
Godard, W. R.  
Grady, F. V.  
Graham, J. R.  
Greene, Chas. J.

Hall, O. M.  
Harper, S.  
Hamilton, C. W.  
Haughton, W. A. A.  
Hewitt, J. J.  
Hingst, H. W.  
Hogan, M. F.  
Huffman, R. W.  
Jackman, V. M.  
Kay, L. D.  
Louden, W. R.  
Massey, L. E.  
Mitton, G. I.  
Moyer, W. M.  
Mutton, H. A.

MacDonell, M. J.  
McIsaac, S. G.  
Rattle, W. F.  
Robinson, J. A.  
Scharff, R. L.  
Slack, C. S.  
Storey, E. A.  
Urie, B. A.  
Walley, G. A. C.  
Walker, J. G.  
Warner, T. W.  
Ward, W. C.  
Waring, A. W.  
Westlake, L. J.  
Woods, A. R.  
Wright, J. E.

PASSED IN ANATOMY.

Bisnett, A. M.	Greene, C. J.	McDougall, R. H.
Boyd, J. A.	Hall, O. M.	McKinley, A. W.
Bradford, R. A.	Harper, S.	Ramage, C. C.
Bristow, R. W.	Hamilton, C. W.	Rattle, W. F.
Calkin, V. C.	Haughton, W. A. A.	Robinson, J. A.
Campbell, R. H. M.	Hingst, H. W.	Scharff, R. L.
Courville, E. G.	Hogan, M. F.	Simms, F. C.
Dodds, F. E.	Huffman, R. W.	Simon, M. L.
Donald, S. K.	Jackman, V. M.	Slack, C. S.
Dutton, E. M.	Massey, L. E.	Storey, E. A. ,
Ferguson, R. H.	Mahoney, R. L.	Strachan, C. L.
Florian, S. D.	Mabee, J. C.	Urie, B. A.
Foote, J. C.	Moyer, W. M.	Walley, G. A. C.
Galbraith, R. M.	Mutton, H. A.	Walker, J. G.
Gardiner, W. O.	MacDonell, M. J.	Warner, T. W.
Godard, W. R.	MacLellan, D.	Waring, A. W.
Grady, F. V.	MacMillan, D. D.	Wright, J. E.

PASSED IN PHYSIOLOGY AND HISTOLOGY.

Beck, C. L.	Hall, O. M.	McGinnis, J. A.
Bisnett, A. M.	Harper, S.	Melsaac, S. G.
Bliss, H. C.	Haughton, W. A. A.	Ramage, C. C.
Bradford, R. A.	Hingst, H. W.	Rattle, W. F.
Campbell, R. H. M.	Hogan, M. F.	Scharff, R. L.
Coutts, W. M.	Huffman, R. W.	Slack, C. S.
Dodds, F. E.	Jackman, V. M.	Storey, E. A.
Donald, S. K.	Kerr, G. A.	Strachan, C. L.
Dutton, E. M.	Kelly, V.	Taylor, A. W.
Ferguson, R. H.	Lloyd, D. D.	Urie, B. A.
Florian, S. D.	Louden, W. R.	Walley, G. A. C.
Foote, J. C.	Mitton, G. I.	Walker, J. G.
Galbraith, R. M.	Miles, R. L.	Warner, T. W.
Godard, W. O.	Mutton, H. A.	Waring, A. W.
Grady, F. V.	MacDonell, M. J.	Wagner, G. W.
Graham, J. R.	MacMillan, D. D.	Woods, A. R.
Greene, C. J.	McDougall, R. H.	

PASSED IN OPERATIVE DENTISTRY (PRACTICAL).

Barnes, David	Kerr, G. A.	Wagner, G. W.
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PASSED IN PROSTHETIC DENTISTRY (PRACTICAL).

Barnes, David	Kerr, G. A.	Wagner, G. W.
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AVOIDANCE OF GINGIVA OVERLAPPING THE FACE OF A ROOT.—  
A good method of avoiding the use of a pin and temporary stopping between sittings in order to prevent the gingiva from overlapping the face of a root which has been prepared for a Davis, or similar crown, is as follows: Mix up some zinc oxide and eugenol to the proper consistency (thick paste) and incorporate in a pledget of medicated cotton. Then pack carefully in the root and over the face of the root. This will harden shortly afterwards. The substitution of the impregnated cotton for a pin eliminates the danger of the pin loosening and being swallowed.—(Nathan Leslie, D.D.S.), *Dental Record*.

# THE COMPENDIUM

This Department is Edited by  
THOMAS COWLING, D.D.S., Toronto

A SYNOPSIS OF CURRENT LITERATURE RELATING  
TO THE SCIENCE AND PRACTICE OF DENTISTRY

## THE BACTERIOLOGY OF DENTAL CARIES.

AN account of the recent investigations and findings of Professor James McIntosh, McWarwick James, and Dr. Lazarus-Barlow regarding the causative factors in dental caries, is reported in the *Lancet*. The conclusions arrived at by these investigators, as summarized in the *British Journal of Dental Science* are:—(1) The examination of selected carious material showed the constant presence of a definite type of bacillus; (2) this bacillus is capable of forming a high degree of acidity by the fermentation of carbohydrates; (3) teeth left in contact with cultures over prolonged periods showed changes almost identical with "natural caries,"—erosion of enamel, penetration of the dentinal tubules and the formation of liquefaction foci; (4) this bacillus, in its resistance and formation of acid, resembles the acidophilus group of Moro; biologically there are several points of difference to this bacillus, so it is proposed to give it the name of *Bacillus acidophilus odontolyticus*; (5) the successful production of artificial caries by pure cultures of the organisms isolated goes far in establishing the microbic theory of caries.

Commenting editorially on the report of these investigators, the *Lancet* says: "It is a valuable addition to knowledge of the etiology of this disease. On the bacteriological side it represents a distinct advance, for whereas before bacteria could only be implicated as providing the source of the acid which destroys the calcified tissues of the teeth, without specifying the organism involved, we now appear to be within measurable distance of knowing definitely the precise nature of the bacterial agents in the process and the conditions under which they work. The brilliant researches of W. D. Miller, which stand out the more conspicuously in proportion as we discover more of the various aspects of dental caries, showed very clearly that the carbohydrate food-stuffs provided the pabulum from which the lactic acid responsible for the destruction of the teeth was derived, and also that the chemistry of the process was due to bacterial agency.

Since then research has been chiefly devoted to the dietetic aspect of the disease, and the labours of Dr. Sim Wallace have resulted in much valuable additions to our knowledge. On the bacterial side the advances have been slower; though attempts to implicate a special organism as the cause of the acid formation have failed, yet research has steadily advanced in the direction of isolating certain organisms from the abundant flora of the mouth as being more directly concerned in the production of dental caries. The work of P. R. Howe in 1917 represented a considerable advance, for he was able to show that the Moro-Tissier group was constantly present in dental caries. He did not conclusively demonstrate their ætiologic role, but pointed out that more nearly than any other organisms did they possess the attribute for inaugurating the process of dental caries.

"At this point the work of McIntosh, James and Lazarus-Barlow carries on the knowledge a stage farther; the two organisms [one?] they have isolated in a very large percentage of cases resemble the organisms described by Howe, though differing in certain cultural reactions. Their careful and ingenious technique appears to leave no loophole for error, and shows very clearly that they are fully cognizant of the complexity of the problems to be solved. It may be premature to assert the specificity of the microbic agent in dental caries—much more work needs to be done before that is possible, but at least a clear pathway of research is opened up through the cumulative endeavor of past and present workers in the field.

"The importance of elucidating the problem of dental caries lies in its application to the prevention of the disease rather than to its treatment. The latter depends on the mechanical removal of infected dentine and enamel, the shaping of the cavity in accordance with certain physical principles and the filling of it with a water-tight plug. Though a better understanding of the pathology of dental caries may not be without its influence on conservative dentistry, it is hardly likely that it will materially modify it. On the other hand, the prevention of dental caries is entirely dependent on correct pathology. At present the principles of preventive dentistry are based almost entirely upon the dietetic factor in caries. Dr. Sim Wallace allows no significance to the structure of the dental tissues. Yet considered theoretically, it is obvious that since the carbohydrate pabulum and the bacteria which can turn it into lactic acid are the two necessary elements in the production of dental caries, its incidence might be lessened by dealing with the bacterial factor as well as by attempting to eliminate carbohydrate stagnation. If there were many organisms in the mouth capable of causing acid formation, then the possibility of influencing the incidence of the disease by altering the mouth flora might not be feasible, but if there are only one or two organisms possessing this power, then such a method of attack on

dental caries might be conceivable. At any rate the possibility of enlisting another weapon in the campaign against dental caries should be borne in mind. It must also be remembered that the further study of these acid-forming organisms, with reference to the conditions which favor or inhibit their growth, and whether all forms of carbohydrate food are equally fermentable by them, may have a repercussive effect on knowledge of food-stuffs in their relation to dental caries, and so enable us to formulate the principles of prevention with greater surety."

#### A RELIABLE HEMOSTATIC.

**I**N the August issue of the "Dental Register" there is an account of a new hemostatic—Thromboplastin (Squibb)—which is said to produce results in dental practice which are little short of miraculous.

Thromboplastin is a true physiological hemostatic prepared from cattle brain in accordance with the directions given by Dr. Alfred F. Hess, who is connected with the Research Laboratory of the New York City Department of Health. It contains the lipid substances of brain tissue (as described by Hirschfelder) in a physiological solution of sodium chloride and preserved with a 0.3 per cent. solution of tricresol. In tonsil and adenoid operations it has been, according to a report by Dr. John J. Cronin (see *Journal American Medical Association*, 1917), of decided value in decreasing bleeding and the incidence of undue hemorrhage. In such cases it has been used as routine applications. Of its use in connection with more than two thousand tonsil and adenoid operations, Dr. Cronin says: "Not in a single instance has the operator or nurse been compelled to return to care for a bleeder after operation since the use of Thromboplastin was made a routine procedure. It is safe, effective and easily applied."

In maternity hospitals it has been employed locally in cases of melina neonatorum, in bleeding from the cord, vagina, skin, mouth. It has also been used after circumcision, etc. The results have proven more than satisfactory, as well as lasting, even where other measures previously tried were of no use. Wherever it can reach the site of bleeding, Thromboplastin solution has proved itself of practical value. In cases of true hemophilia it may be regarded as almost a specific hemostatic. Where local applications fail, it should be injected into the site of hemorrhage, as in the bleeding from gums following tooth extraction. In addition to its hemostatic action this tissue extract has been found to possess healing properties, by actively stimulating granulation tissue and hastening epithelization. It is therefore applicable as a dressing for torpid ulcers and for sluggish wounds.

With the use of Thromboplastin in obstinate bleeding following

tooth extraction, Dr. W. J. Brownell, of Chicago, has had some experience. Being a "bleeder" and about to have some teeth extracted, he looked about for an efficient hemostatic. Other means failing, he at last resorted to the use of Thromboplastin and secured very gratifying results. He describes his method of application as follows:—"I had the gum tissue injected with 3 c.c. of the 'hypodermic' type of Thromboplastin. This was effective for about six hours, when a slight oozing was noticed. I then had 20 c.c. injected subcutaneously in the abdominal region. This was followed an hour later by a similar injection of 20 c.c. of solution, although the physician in charge says that the second injection was not needed, as the bleeding had ceased. There was no further recurrence."

The solution may be applied to the tooth socket locally by packing same with cotton saturated with a few drops. Or, it may be applied pure, direct to the bleeding surface by means of cotton gauze or a tampon. It must come into direct contact with the bleeding point; if soft clots have formed, they should be removed. Furthermore, although a cursory application in many instances will suffice to hasten coagulation, where such does not occur, the hemostatic should be held in close contact with the bleeding surface for some minutes.

Both the local and hypodermic forms are marketed in 20 c.c. vials, which should be kept in a cool place, preferably in the refrigerator.

#### MATRICULATION REQUIREMENTS.

FOR a number of years both medical and dental schools have been working towards the limiting of the number of students allowed to enter the schools. Those who were fortunate enough to gain admission, were confronted with an extended course of study. New subjects had been added to the curriculum and the old subjects had been enlarged and elaborated almost beyond recognition. Consequently a longer school period was required to meet the new conditions. Many who could have met the entrance requirements found it impossible to finance the proposed undertaking under the new conditions. These men sought a new field of endeavor, and being anxious to follow some professional career, have entered the osteopathic, chiropractic and allied institutions. Is this a good thing for the medical and dental professions?

Many and varied are the opinions expressed regarding this policy of raising the standard of admission and enlarging the courses of study. Some claim it is a necessary expedient from the standpoint of public interest and safety; others maintain that the results do not warrant the continuance of such a policy.

A report of an interview with Dr. William J. Mayo, in the *Minneapolis Journal*, June 12th, credits him with this statement:

"The University should provide that anyone who wants to enter a University may do so provided he is capable of meeting the requirements. The University has no right to add subjects to its curriculum that are not useful today. We are giving the students an enormous amount of information that is of no use."

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## A Tribute to Our Friend the Dentist

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OUR relation to the dentist is an interesting one. He relieves our ills, repairs our negligence and blunders, usually with sympathy and skill. With friendly insight he tells us the story of our misconduct. With plain, direct wisdom he counsels us as to daily conduct and practice. His warnings are based on facts with little of theory.

The skill of an able dentist is a matter of mystery and admiration. His craftsmanship runs into delicate surgery, or is akin to that of the artisan in jewelery. One remarked to us with modesty: "A dentist is a super-tinker." From that array of tiny instruments he must select just the right one for use in a minute, often obscure, spot. He must apply force with amazing nicety. Behind the infinitesimal though hard wall is the nerve. With only experience and judgment to guide him, the dentist measures its thickness as with an instrument of precision; he determines its degree of resistance to his gnawing tool. A miscalculation and his work is lost; the plan of restoration destroyed—and, important to us, shrill pain, and maybe the loss of a tooth. Yet we seldom hear of such mishaps. Our own experience reports no such happening, and suggests only admiration for the skill, gentleness, and wisdom of the dentist.

We like them, too, on their personal side. Those we know have an amusing knowledge of human nature, seen in miniature crises that display it brazenly. With exhibits of weakness, cowardice, even, they are very tolerant. We like their testimony to the nerve and courage of women. They seem to have a tireless interest in their patients as cases and as persons.

Because of the skill of its practitioners, and of their public and individual service in matters of health, dentistry stands high among the benign professions. Happy the man, and happy the family, that has a good dentist!—*Collie's*.

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GREEN STAIN.—Though "green stain" can be removed from the teeth by means of a paste of powdered pumice and tincture of iodine, it is not so well known that a paste of pumice and peroxide of hydrogen is equally efficacious.—*British Dental Journal*.

# JUVENILE JINGLES

*Contributed to ORAL HEALTH by Dora L. Cameron,  
Wenatchee, Wash.*

MRS. CAMERON has become widely known through her inimitable health rhymes for children which have appeared at intervals in ORAL HEALTH during the past year or two. These rhymes are of value to School Teachers, Nurses, Dentists and others interested in Oral Hygiene propaganda or engaged in educational work. Mrs. Cameron is the wife of Dr. W. P. Cameron, a practising Dentist in Wenatchee, and has been frequently urged by many of her friends to publish her poems in book form, that they might be readily available for use at all times.

Mrs. Cameron's keen interest in health work, and especially in the dental phases of the health problem, has led her to prepare some new poems. These will appear in ORAL HEALTH at regular intervals during 1923, under the caption "Juvenile Jingles." We hope that our readers will see that any of these little rhymes that may appeal to them will find their way into the hands of those who can best use them in inculcating health principles into the minds of the kiddies of our land.

## HOW TO GO TO SLEEP.

Always close your mouth, my dears,  
Before you go to sleep,  
For if you don't, bad fairies come,  
And in your mouth they'll creep.

And they will run around your mouth,  
And they'll run up your nose;  
You'll find it won't be very long  
Till a naughty adenoid grows.

And then you can't breathe through your nose,  
And you will have to go  
And have the doctor take it out,  
And that's not nice, you know.

So don't forget what I have said,—  
Oh, not a single night.  
Remember fairies can't get in  
Where mouths are shut up tight.

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MAKE A SURVEY OF THE MOUTH.—Before you begin to operate, make a good general survey of the whole mouth by lifting up and out the lips and cheeks, so you can get a clean view of the entire oral cavity. As a rule, the patient comes simply because of a troubling tooth, but, in reality, the whole masticatory apparatus needs reconstructing, so don't begin to operate on the troubling tooth until you see and have made up your mind as to what the whole mouth really needs.—*Dental Facts.*



*BRITISH COLUMBIA*—A. T. OBERG, D.D.S.,  
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*ALBERTA*—JOHN W. CLAY, D.D.S.  
914 Herald Bldg., Calgary

*SASKATCHEWAN*—C. W. PARKER, D.D.S.  
Imperial Bank Bldg., Regina

*MARITIME PROVINCES*—STANLEY BAGNALL, D.D.S., Halifax, N.S.

*MANITOBA*—W. W. WRIGHT, D.D.S.  
767 Warsaw Ave., Winnipeg

*ONTARIO*—Lieut.-Col. W. G. THOMPSON  
28 King St. West, Hamilton

*QUEBEC*—ALBERT DELORME, D.D.S.  
713 St. Catherine St., East, Montreal

### MARITIME PROVINCE NOTES.

THE annual meeting of the Halifax Dental Society, and the first for the winter season, was held on October 24th. The first business of the evening was the election of officers, when the following were elected: Pres., Dr. G. N. Stults; Vice-Pres., Dr. G. R. Hennigar; Sec.-Treas., Dr. J. Stanley Bagnall; Prop. Officer, Dr. F. W. Ryan; Executive, Dr. R. H. Woodbury.

The programme for the evening was a clinic lecture and discussion on synthetic porcelain. The question of the use of color charts arose during the discussion, and most of the members felt that it was better for the operator to develop his artistic sense, rather than to depend on the elaborate shade-mixing charts, which are furnished by some of the manufacturers. The basis of these charts is the shade guides furnished by the various tooth manufacturers, and, as it is so difficult in many cases to match the color of the natural teeth by a tooth on a shade guide, it was felt that they were of little real benefit in obtaining esthetic results.

The perennial question of the death of pulps under "synthetic" arose in the discussion. Does it kill pulp or not? Opinion was certainly divided, but at least all present thought that cavity lining should be used, and pulp capping in the case of deep cavities. The question of the death of a pulp under a "synthetic" filling reminds us of the patient who reported lately for treatment with a central incisor, which showed the symptoms of a putrescent pulp quite plainly. There was a "synthetic" on the distal, and a gold inlay on the mesial, neither of which was very large. An X-ray was taken at rightangles to the labial surface of the tooth, this showed the "synthetic" filling to be apparently about half a millimetre closer to the pulp; but neither filling was at all close. Well, of course, the "synthetic" was blamed. The patient was questioned rather carefully as to any further history of the case, especially whether or not he had received a severe blow in that region, and it was found that a short

time before the symptoms were noted he had received a very severe blow, which brought the two jaws forcibly together. Was the "synthetic" filling guilty?

\* \* \* \* \*

Dr. Wm. Fletcher Burns, of Syndey, C.B., one of the outstanding figures in dentistry in the Maritime Provinces, died early in October. Dr. Burns graduated from the Philadelphia Dental College in 1875, when a college course consisted of two terms of about four and a half months. Dr. Burnett, of Sussex, N.B., was a member of the same class. They were two of the first men from the Maritime Provinces to obtain the D.D.S. degree.

Dr. Hannah, of St. John, and Dr. J. S. Bagnall, of Charlottetown, who are both actively engaged in practice at the present time, were juniors in college when Dr. Burns was a senior student.

J. S. B.

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#### ALBERTA

THE Edmonton Dental Society held its annual meeting for the election of officers in November, and the following were elected for the coming year: Dr. R. A. Rooney, President; Dr. H. E. Bulyea, Vice-Pres.; Dr. M. Dunsworth, Sec.-Treasurer.

Dr. O. F. Strong, convener of the Provincial Hygiene Committee for Northern Alberta, gave an interesting talk on the work being done by himself and Dr. V. H. Macauley, of Calgary, for Southern Alberta with lantern slides and lectures. The committee possesses two lanterns, slides and skeleton lectures to be sent out to various points in the Province for dental educational purposes.

\* \* \* \* \*

Dr. V. H. Macauley, of Calgary, has just been elected to the Calgary School Board for 1923 and 1924. He polled a very high vote as a citizens' committee candidate, in opposition to a strong labor slate. Here's wishing him a wise mind, a ready tongue, and a firm seat as he rides out for adventure, on the rough road of civic politics.

J. W. C.

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#### MANITOBA

THE annual meeting of the Manitoba Dental Association was held in Winnipeg on Jan. 8, 1923, three new officers being elected to the Board in the persons of J. F. Morrison, H. J. Merkeley, Winnipeg, and E. H. Clark, Minnedosa. Dr. H. A. Croll is President; J. F. Taylor, Vice-President; C. P. Banning, Secretary; J. F. Morrison, Treasurer-Registrar.

The relationship that often exists between infected teeth and various forms of chronic diseases, and the importance of the closest co-operation between physicians and dentists, were strongly emphasized by Dr. J. G. Meisser, of the dental research department of the Mayo Clinic, Rochester, when he delivered an address on foci of infection before a meeting of the Winnipeg Dental Society and the Winnipeg Medical Society in the Fort Garry Hotel, Thursday night.

The meeting was called by the Dental Society. Members of the Medical Society, of the Government, and representatives of the School Board and the University of Manitoba were invited to attend. It was a very representative meeting both of the dental and medical societies, close to 200 people being present. Hon. R. W. Craig, K.C., Attorney-General, and several other members of the Government were also present, together with W. J. Spence and William Tier, representing the university.

The lecture was preceded by a dinner, presided over by Dr. E. Roy Bier, president of the Dental Society, and was followed by a discussion in which many members of both professions took part.

Dr. Meisser has for some time past been associated with Dr. E. C. Rosenow in very important and successful dental research work at the Mayo clinic. His address was illustrated with lantern slides, and was conceded by all taking part in the discussion which followed to have been one of the most interesting and valuable, from an educational standpoint, that had been delivered before the society for some time.

Declaring that chronic disease is often the result of infection by bacteria harbored by infected teeth, he explained how this has been proven in the Mayo clinic by experimental work.

"Through the devitalization and infection of teeth in dogs we have experimentally produced a condition like that often found in man," Dr. Meisser declared. "The infection produced in teeth of healthy animals by bacteria from the patients' foci, in the course of a few months developed a disease similar to that found in the patients. Furthermore, the condition of the devitalized teeth in dogs was similar in every respect to that of devitalized teeth in man."

Dr. Meisser explained that these experiments have proved that infected teeth have frequently resulted in such chronic diseases as arthritis, gastric ulcer and diseases of the urinary tract. He also emphasized the importance of interpreting accurately the X-ray findings in accordance with the clinical findings, and advised that where definite relationship was found to exist between the patient's condition and an infection of teeth, the teeth should be removed without hesitation.

"The results of our experimental investigation and the results in patients following the removal of foci of infection were possible only through the close co-operation of physician and dentist," Dr. Meisser stated. Through our experiments on animals with bacteria from the infected teeth and tonsils of patients, we were able to demonstrate a relationship in a great many cases when the removal of foci did not benefit the patient.

"A study of patients who remain ill and deformed for life because they have for years harbored infection in their teeth emphasizes strongly the need of preventive medicine."

The discussion which followed Dr. Meisser's address was led by Dr. Charles Hunter. Many of those taking part in the discussion dwelt on the benefits to general health conditions that will arise from the latter day practice of more thorough instructions as to care of teeth of children in the school.

A moving picture, entitled "Your Mouth," by Dr. Edwin Kent, has been purchased by the Educational Committee representing Manitoba Dental Association and Winnipeg Dental Society. It is now being circulated in picture houses.

W. W. W.

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## I Am the Baby

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I am the Baby.

I am the youngest Institution in the World—and the oldest.

The Earth is my Heritage when I come into being, and when I go I leave it to the next Generation of Babies.

My Mission is to leave the Earth a better place than I found it.

With my million Brothers and Sisters I can do this if the World does not impose too many handicaps.

Now I need Pure Milk and Fresh Air and Play.

When I am a little older I shall need good Schools in which to learn the Lessons of Life.

I want to live, laugh, love, work, play.

I want to hear good Music, read good Books, see beautiful Pictures.

I want to build Houses and Roads and Railroads and Cities.

I want to walk in the Woods, bathe in the Waters, play in the Snow.

I am Yesterday, Today and Tomorrow.

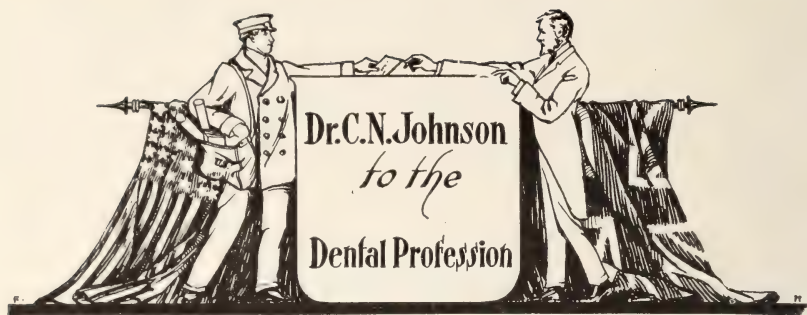
If you will make my way easy now, I will help you when I grow up.

I am your hope—I AM THE BABY.

—Anon.

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CARE OF HANDS IN THE LABCRATORY.—Before opening vulcanizer, or working in plaster, or with flasks, if you will wash your hands in soft water with good soap, and, while still moist, pour on and rub in olive oil, you will find when you are ready to cleanse the hands that the stains have not penetrated the skin.—*Dental Facts*.



## To the National Dental Association and Return

*(Continued from December Issue.)*

WE sailed from Seattle on the splendid ship "Prince George" Sunday night, and waked up next morning near Vancouver. The "Prince George" and her sister ship, "Prince Rupert," belonging to the Canadian National line, are really magnificent boats, splendidly equipped and well manned. From the cabin boy up, the officers are courteous, and apparently solicitous for the comfort and welfare of their passengers.

We had a delightful day in Vancouver, a city which, in common with most of the other cities of the coast, is improving in a very marked degree. The Governor-General was there that day, and the city was in holiday attire. But what I enjoyed more than anything else was meeting a good friend of mine—a good friend of everybody—Dr. W. J. Bruce—"Billy" Bruce, I like to call him. The moment we stepped into his office the town was ours, and the fullness thereof. There never was a finer representative of any profession than this same man, and when the records of all good men and true are finally made up, the name of Billy Bruce will stand in the foremost column. He took us to luncheon at the Vancouver Hotel, a place that has been entirely reconstructed since I was there last; and then he had us driven around the city, out to Stanley Park, through the Chinese quarter, and other interesting places, till we had seen Vancouver in the most delightful manner. Then he got us a pass to go on board the new C.P.R. steamship, the "Empress of Australia," which had just been put in commission for the Oriental service, and was about to make her maiden trip. This boat was built in Germany, and was obtained by the British in the readjustment after the war. With her sister ship, the "Empress of Canada," she will make a noteworthy addition to the passenger service of the Pacific. She is a magnificent boat, built on the same general plan as the famous

"Imperator"—the 900-foot ship on which my family and I went to Europe the year the war broke out. She has a swimming tank, and elevator running between the different decks, just as did the Imperator. Some day I want to go to Japan on one of those splendid ships, and I can imagine no more wonderful trip than to go over the Canadian Rockies by train, and then embark for an ocean voyage on a floating palace like that.

It was hard to say goodbye to Billy Bruce, and to his fine young lady assistant, Miss Crockett, who had devoted herself unselfishly to our enjoyment that day; but ships will not wait, and ours was ready to sail. Anyhow, Dr. Bruce has promised to come to Chicago some day, and this saved the situation.

The next morning we were well up the British Columbia coast, reveling in the beautiful scenery and walking the decks with our wraps and overcoats buttoned. Fortunately, we escaped the fogs,



S.S. Prince George,  
Plying between Seattle and Prince Rupert

From Vancouver to  
Prince Rupert.

but the air was hazy from the forest fires, burning over on the mountains. These forest fires are the bane of British Columbia, and, in fact, of the entire north country. Sometimes they are perfectly terrible in their devastation, and there seems no human way of completely preventing them. They have done more damage than can ever be estimated, and they constitute one of the most serious problems the settler and the woodsman have to solve. The Government is instituting every known measure to control this constant menace—even to using airplanes, as a means of rapid action when a fire has broken out. But, as Colonel Rogers, Superintendent of Jasper Park, remarked to me: "Nothing but Providence can stop a top fire—one that leaps across the tops of trees. When it once gets started, it travels a mile a minute. The underbrush fire is not so bad."

That afternoon we called at Ocean Falls, a town on the side of the mountain, where the Pacific Pulp Mills are located. These mills employ altogether about 1,500 men, and have a capacity of 260

tons a day. The investment is about \$15,000,000, so the enormity of the enterprise may well be imagined.

Mr. Crawford, the obliging purser of the Prince George, volunteered to escort us through the plant, and it was an exceedingly interesting experience. Most of the men seemed to be Japanese, and I am wondering, by the way, how that entire coast, from San Diego north, would get along without Oriental labor. But, as Rudyard Kipling would say, that is another story.

The following day about noon we came into Prince Rupert—passing the last hour or two through numerous fleets of fishing boats. I had no conception of the magnitude of the fishing industry at this point. On the train going east that evening, we carried three cars of fish, two for Winnipeg, and *one for New York*. I was amazed to learn that they shipped fish from far north Prince Rupert on the Pacific to New York on the Atlantic. They were, of course, halibut, and there are no halibut like the Pacific variety. The only way to *know* things is to travel and find them out.

I was confused about the population of Prince Rupert. One man, who lives there, told me 4,000, and another told me 7,000—take your choice. Both men were strangers to me, and I figured it this way: One of them was anxious to get me to locate there, and the other was afraid I would. Anyhow, there is a lie out some place. I am going back there one day and run this thing down—I dislike an uncertainty.

When this boat trip up the inside passage from Seattle to Prince Rupert is better known, it will attract crowds of passengers. The journey is pleasant in the extreme, and, as I have intimated, it is made doubly so by the courtesy of the steamship officers. One illustration will suffice. We had been told by the steward that if we got tired roaming around Prince Rupert that day and wanted to rest, we were very welcome on board ship, where we would be comfortable. The dock and railway station were side by side, so it was convenient for us to do this. After luncheon, I was sitting by a desk in the main cabin, with my daughter, when the cabin steward, in passing by, noticed that I was drowsy. "Doctor," said he, "come with me. You are uncomfortable in that chair." And he led me to his own cabin and showed me in. "You may lie down there," he remarked, "and no one will disturb you." Attention of that considerate and courteous nature means much for the success of any route of travel.

For the first hundred miles, the train from Prince Rupert runs along the Skeena River, and near the mouth we saw a number of fishing villages, with row upon row of houses standing side by side, all apparently alike, and perched up on piles, with water marks on them, showing the rise and fall of the tide. Imagine the lack of

playgrounds for the children under such circumstances. When the tide is in, the houses are standing over water, and when it is out they are over the softest kind of muck, and yet the children—they were mostly Indians or Orientals—looked plump and hearty. After the Skeena River comes the Bulkley River, and after that a wilderness, except for lumber mills and a few straggling farms. At Prince George we met the Fraser River, out of which, years ago, I had caught salmon with an Indian dip-net, farther down, toward Vancouver, near the Cariboo Trail. There is something about the wildness of this country which has always appealed to me—appealed to me as a passenger, not as a permanent resident. About the only crops around Prince George are hay and oats, and they will not have enough of these this year to supply home consumption, and must ship some in.

The Fraser runs to the north at Prince George, and then curves to the east and southeast, toward Jasper Park. We were two nights and a day on the sleeper between Prince Rupert and the Park, where we proposed remaining a couple of days. All along the line, and, in fact, extending as far east as Duluth, wherever there were mountains or forests the ground was carpeted with a pinkish-purple flower, which, the porter told me, was called Indian fire weed. I have never in my life seen such a vast quantity of any flower as we saw of this. It must have ranged at least 2,000 miles, with a few breaks in the thickly-settled regions, and I made an estimate that if it could all be cut and dumped on Yonge Street, Toronto, it would almost smother the city. Surely nature is doing her best, out in these mountains to redeem the landscape from the dreariness occasioned by frequent forest fires.

Our car was sidetracked at Jasper Station about 4 a.m., while the main train proceeded east. Jasper Park is worthy of another installment.—C. N. JOHNSON.

*(To be Continued.)*

*C. N. Johnson*

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OXYPHOSPHATE OF ZINC CEMENT—It is not generally recognized that a thin layer of cement gives all the hold that can be obtained in securing inlays, crowns, and bridges in position, and that it is an absolute waste of good material to use more than a coating film; further, that no additional strength is gained for the "setting" by a thick layer of cement.

## Correspondence

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LETTER FROM DR. ASHLEY W. LINDSAY, WEST CHINA.

Dental Department,

Chengtú, West China, November 26, 1922.

Wallace Seccombe, D.D.S.,  
Toronto, Ontario, Canada.

Dear Doctor Seccombe:

It was easy to promise to write to you while in that grateful mood of appreciation which I had for all that you and others had done for me during my stay in Toronto; but in the lively bustle of overcrowded days of readjustment in which I am now living I find letter-writing one of the things which I am most easily persuaded to overlook. Distance, they say, lends enchantment to the view, but I can testify that it also lends a dullness to the conscience, especially so when the factor of time is added to distance, which it is in our position here. The knowledge that a letter takes at least six weeks to reach you tempts one to put off the day of getting at it, much the same as you put off getting at that paper you know you must give, till the last minute, being then compelled to rush it through without giving it the polishing you intended, to make it represent your whole mind in the matter.

In this last mood I am forcing myself to sit down to tell you that Mrs. Lindsay and myself, after a pleasant, though, at times, a warm trip, arrived in Chengtú at our journey's end on June the seventeenth, being but eight weeks en route. As compared with the five months' duration of our first trip, fifteen years ago, this was but a pleasure trip. We travelled from Montreal to Shanghai in the care of the Canadian Pacific Railway and Ocean Service. Canadians should be proud to know that a Canadian corporation provides the quickest, the most comfortable, and up-to-date means of travel to the Orient.

After attending the National Christian Conference, to which we were accredited members, and making such purchases as can best be made in Shanghai, we left for the interior by a river steamer, which was supposed to carry us, through the first night, many miles on our way up the river Yangtse; but we awoke that next morning to find that we were still out in the Yellow Sea, with dense fog thick upon us. Our ears were filled with the sound of the fog horns, as ours and other boats attempted to move on; or the clang of the ship's bells as we were forced to anchor. I opened our stateroom door during one spell of seemingly unintelligible and frantic hoots of ships' whistles, to be greeted with the sight of a vessel only some yards away from ours. She, with our ship, was keeled over with an effort to put more clear water between us. So far as any

admission of this incident by the officers of our vessel, one might suppose that the only danger there had been was the fear of scraping each other's paint. After this episode we anchored and waited the clearing of the fog.

The remainder of our trip to Hankow, five-hundred miles inland, was accomplished without incident. 'Tis true that we saw many signs of the awakening of China, as evidenced by the sight of large factories in port cities and large mines with up-to-date equipment, as well as imposing railroad yards, stations, and in a few places roads good enough for autos to travel. But we could ever see the sick, the blind, the demented, the lame and the beggar on every



Dental Building, West China Union University.

hand, with never a seeming attempt to care for them. Civic responsibility for such is never attempted, except in a few enlightened centres.

Well, to continue with our journey. We were fortunate at Hankow in securing bookings in a small up-river steamer sailing direct to Chungking. This port marks the end of river travel for us. From there Chengtu is but a ten days' trip. We were carried by this up-river steamer 500 more miles to Ichang, the old head of navigation for steamers but a few years ago. Here we were not forced to change steamers, as is usual, but passed right through in our good ship "Shu-Hun," the pioneer of up-river ships of her class.

It is in the run from Ichang to Chungking, some 400 miles, that we pass through the most wonderful gorges to be seen on any waterway, also a series of rapids must be negotiated which daunt all but the most courageous. The days spent in the gorges are ones never

to be forgotten,—the kaleidoscopic change of coloring in rock and earth and plant and sky,—the majestic towers of rock, now resembling pyramids, cathedral spires, middle-age battlements, or volcanic chaos, and ever and anon the rocky walls parted but enough for us to pass through a deep and eerie canyon, dwarfing us, till we were forced to realize how small we bulked as matter.

We passed all the rapids without mishap, though we were constantly reminded of their dangers by the sight of wrecked junks or maybe the bodies of the drowned, those torn from this life by the treachery of some hidden rock or whirling cataract. Our ship, rated at over fifteen knots an hour, at times could barely make headway in some swift currents. Do you wonder then that, as a rule, native junks only attempt the journey in the low water of the winter months, when they make the journey from Ichang to Chungking in about thirty days, while we but took three days and a half by steamer?

From Chungking we travelled, in sedan chairs, for ten days to the capital of the Province of Sze Chuan. The road over which we wended our way, you would call a trail; but to the Chinese it is "the big road," because, forsooth, in many sections it is paved with stone slabs from  $1\frac{1}{2}$  to 4 feet wide. To a land where a very sticky clay forms the road surface on most roads, these slabs make an all-weather road that merits the name of "big."

The roads in Sze Chuan also furnish another apparent paradox. To you, travel on a road suggests carts, carriages, automobiles and other wheeled vehicles; to the Chinese in Sze Chuan, wheels on this road are not thought of, or perhaps I should say not allowed, for their use would too soon wear out the stone slabs. Walking, therefore, is the accepted mode of travel. You either use "shanks mare" or hire several coolies who are willing to use theirs in bearing you in a sedan chair.

A day's journey ranges from 30 to 40 miles. A day means from daylight to dark. This means that one must rise before sunrise to be ready to start at the first streak of light. Should the day be cool and dry, all goes well; but should the weather be warm and wet or cold, much energy must be expended in urging the coolies to make the day's stage.

The hotels or inns, as we call them, at which one is compelled to spend the night, could not by any stretch of imagination resemble what you know as a hotel. In cold weather, when there is but little moisture in the air, one might believe that a room in a Chinese inn, on first acquaintance, was equal to a room in a country barn in Canada; but in hot weather, no one with an uneducated nose, ear or eye can imagine the actual condition. Travel in the Orient is the only possible teacher. Actually, I was wakened, several

mornings on the trip, by my sub-conscious mind being unable to stand the awful stench of sour earth which arose from the mud floors of our rooms.

Would you expect to find a bed in such an inn, ready for your tired limbs, after a hard day on the road? Yes, a bed of sorts; but without the bedding you have carried with you in your loads, you could not use it. Let me mention a few things you will find it necessary for you to have with you. These will help you to realize what you cannot find in the inns,—your bed, if you wish to be comfortable; a mosquito netting, bedding, food, a cook, cooking utensils. Also let me mention a few things that you can pick up in these inns—fleas, bed bugs, lice, all types of fevers, skin disease and sore eyes. These last items are provided free to all who will take them. I have often been asked why we did not take a tent along and use that for our resting place. To answer this suggestion would require a description of Chinese life in a village or town, but enough will be said when I say that there are no parks or pastures or empty spaces about the towns in this province.

I must not weary you further with details of travel in China. Suffice it to say that we arrived in our adopted home safely after both pleasant and unpleasant experiences, in good health and, we trust, fit to put in a good term's work.

I do not propose to say anything about our work in this letter, so I will close with the promise of another, to be written sometime in the not distant future.

With very best regards to all my friends and your good self and family, I am,

Yours sincerely,

ASHLEY W. LINDSAY.

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LETTER FROM DR. F. A. STEVENSON, MONTREAL.

4th January, 1923.

To the Editor of Oral Health:

Sir,—In your December number you publish an extract from a paper by Doctor William Hunter, entitled "Septic Anæmia as a complication of Pernicious Anæmia."

The paper is most interesting and instructive, but after reading it one is confirmed in the impression that the inhabitants of the British Isles do not value as they should the possession of healthy natural teeth.

Doctor Hunter states that nine-tenths of the cases of Septic Anæmia are caused by "Bad teeth and Pyorrhoea." He then proceeds to advise the extraction of all the teeth, healthy and diseased, in order to remove the cause of infection. His argument is, that the healthy

teeth, in cases of Septic Anæmia, if left in the jaw, may in time become centres of infection, and therefore it is better to extract them.

To those of us who have spent our lives in trying to preserve the health and usefulness of the natural teeth, this advice from one of the leading physicians of the English-speaking world is, to say the least, disconcerting.

If Doctor Hunter were to extend his argument for prevention along similar lines, he might with as much reason advise killing all babies at birth. They have to die sooner or later, and even the healthy ones may contract Septic Anæmia or some other equally deadly disease if they live to grow up.

"Bad teeth and Pyorrhoea" are generally the result of ignorance or neglect on the part of the patient. These are the causes which should be attacked and removed.

Sound teeth are not the cause of disease, and to advise their extraction on the chance of their becoming so is preposterous.

The disastrous results which often follow the wholesale extraction of the teeth are ignored by the essayist; impaired power of mastication, lifelong disfigurement of the patient, and deafness produced by the recession of the condyles of the lower jaw into the Glenoid Fossæ. Can it be that he is ignorant of these things?

Teeth may be extracted at any time if diseased, but no substitute supplied when all the natural teeth have been lost, can give anything like the efficient power of mastication to be obtained from healthy natural teeth.

The disfigurement of the patient which follows when wholesale extraction is practised is a matter not to be despised. Nor should the possible deafness produced by the change in the mandibular articulation be overlooked.

A large percentage of persons who have lost all the natural teeth never succeed in obtaining efficient and comfortable substitutes. This applies especially to the loss of all the teeth in the lower jaw.

Doctor Hunter's services on behalf of suffering humanity are so brilliant that one hesitates to raise even a small protest, but to advise the extraction of healthy teeth because at some future time they may become diseased is not good practice, and gives some sort of excuse to unscrupulous men who unnecessarily mutilate their unfortunate patients for the sake of the fee that may be obtained for so doing.

The description of the shocking mouth conditions prevalent in Septic Anæmia and the treatment recommended to remove the cause, make one feel that neither the laity nor the medical profession appreciate the part played by normally healthy teeth in the general welfare of the individual.

FREDERIC ARNOLD STEVENSON.

154 Metcalfe Street, Montreal.

# ORAL HEALTH

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No. 1

## EDITORIAL

### School Dental Service

FOUR of the local Dentists of Ingersoll, Ontario, conducted a dental survey in the two Public Schools of the town a few months ago, which showed 76 per cent. in one school, and 91 per cent. of pupils in the other school, with dental defects.

Details of this survey are as follows:

#### MEMORIAL SCHOOL—

644 pupils examined.

107 pupils did not require attention at present.

45 pupils with teeth badly coated with tartar and required dental cleaning.

492 pupils with defective teeth—76-77 per cent. defective.

#### WARD SCHOOL—

145 pupils examined.

11 did not require attention at present.

2 pupils with teeth badly coated with tartar, required dental cleaning.

132 pupils with defective teeth—91 per cent. defective.

Dr. Arthur D. Black, of Chicago, read a paper at the recent

meeting of the Chicago Dental Society upon the subject "The Protection of Health in Dental Practice," in which he urged the Dental Profession to take stock to determine what progress has been made in the matter of public health and Preventive Dentistry, and to study the prospects for the future. The question asked and re-asked by Dr. Black throughout his paper was: "What will the radiograms show when this child is twenty-one?" The essayist expressed the hope that this question would be so impressed upon members of the Dental Profession that it would recur in each mind as though emblazoned on the forehead of every child that sits in a dental chair.

The dentists of Ingersoll made a careful survey of the school children in their community, notified the parents of the condition of the teeth of the children, and in the majority of cases the defects were promptly corrected. A number of parents, however, returned the cards, stating that they were unable, financially, to have the service rendered through the regular channels of private practice.

The question may well be asked: "What will the radiograms show when these children are twenty-one?" And this is the question which should be put squarely to the educational and health authorities, not only in Ingersoll, but in all of the other municipalities of the country which have not organized School Dental Service and whose children are in no better dental condition than those reported.

In terms of individual and public health, there is no more important work to be carried forward than the organization of School Dental Clinics. It is to be hoped that this great problem will be again brought to the attention of the authorities, that much progress may be made during the present year.

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## Dental Department, University of Montreal, Damaged by Fire

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**F**IRE, believed to have started in a students' cloak room shortly after midnight on 1st December, 1922, caused damage estimated at from \$250,000 to \$300,000 to the dentistry and veterinary school building of the University of Montreal. Several firemen were injured.

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TO REMOVE SPENCE'S PLASTER FROM PALATAL SURFACE OF PLATE.—Where Spence's plaster is used for cast in vulcanite work, you find, after vulcanizing, that some of the plaster is very hard to remove from palatal surface. Simply apply machine oil; the plaster, being porous, absorbs the oil, causing disintegration, and in a short time may be easily scraped out.—*Dental Surgeon.*

# ORAL HEALTH

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## Extraction Technic of Impacted Inferior Third Molar\*

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THE inferior third molar is impacted more frequently than any other tooth. Where extraction is indicated, the selection of the correct operative technic necessary for its removal demands good judgment. The execution of the technic requires considerable skill. The removal of this tooth is strictly a surgical procedure. It should be executed in such manner as not to disturb the second molar or to cause unnecessary injury to the associated tissues. Structures which may be associated with this tooth when impacted should be kept in mind before, during and after the operation.

### THE OPERATION.

To relieve the pain caused by the tooth, and quite frequently to avoid operating where an operation is indicated, the tissues overlying the occlusal surface, when in inflammatory condition, are irrigated with antiseptic solutions, and such medicaments as iodine, aconite, campho-phenique, or nitrate of silver, are applied. In case of the first attack, temporary relief will usually be obtained by this form of treatment, but, where a number of such attacks have occurred, or where suppuration is established, little or no relief may be expected from such application. The tissues about the tooth are severed with a lancet also in an endeavor to relieve condition, but this usually increases the trouble and affords a favorable field for infection. To postpone the removal of this tooth when it is a source of irritation to the patient, and the conditions cannot be corrected except by its removal, only tends to complicate the operation for its ultimate extraction.

The extraction of the inferior second molar is advocated by some

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operators to relieve the pain caused by an impacted third molar. It is not advisable to sacrifice the second molar in such case, although it is a comparatively simple procedure to extract that tooth. When such extraction is made, it is more frequently a failure than a success, so far as obtaining the desired relief is concerned, and, moreover, the subsequent extraction of the third molar may be found necessary. It is, therefore, better to remove the involved third molar at the outset, and leave a good second molar to perform its function. Some operators extract the inferior second molar to obtain space, but this should be disapproved, as the impacted third molar can be removed in the majority of cases without disturbing the second molar, and the extraction of the inferior third molar should take place to remove the cause and relieve the malady.

Several means have been devised for removing an inferior third molar when it is impacted by its crown impinging on the distal surface of the second molar. The better procedure is to remove the tooth by surgical operation, and avoid the danger of increased inflammatory conditions that may arise as a result of the delay caused by completing the operation by other methods.

#### ETIOLOGY.

A careful examination should be made to determine the cause of the impaction, which is probably due more frequently to heavy gum tissue overlying a part of the whole of the occlusal surface of the tooth, but is sometimes caused by the superior constrictor muscle of the pharynx or buccinator muscle.

Other causes of impaction are:—

1. Where the alveolar process extends over parts of the occlusal of the tooth.
2. Where a dense ledge of bone projects over the disto-occlusal surface of the tooth.
3. Where the tooth is so far embedded in the body of the mandible that little or no alveolar structure is formed about it, the forces of development being insufficient to overcome the resistance offered by the bony structure..
4. Where the third or second molar is in malposition and there are abnormalities in the form of either of these teeth, as where the crown of the second molar is unusually large in its middle diameter compared with its gingival diameter and engages the third molar below this projection.
5. Where the approximating surfaces of the second and third molars are broad and flat, instead of the oval shape peculiar to normal teeth, which conditions may compel the sliding of one broad surface over the other to complete the eruption of the third molar.

6. Where there are supernumerary teeth about the third molar.
7. Where there is not sufficient space between the second molar and the ramus to allow the passage of the third molar.

### HISTORY AND NATURE OF THE OPERATION.

A history of the case should be obtained prior to operating on an impacted third molar. Frequently a patient is under the impression that the operative procedure of extracting an impacted inferior molar is similar to extracting of any other tooth.

Where this idea prevails, and if the operation is expected to be the least complicated, the operator should explain to the patient the character of the operation.

### OPERATIVE TECHNIC.

In giving the operative technic for the removal of the numerous forms of impacted third molars, in the various conditions surrounding them, the most practical procedures will be assigned for the different cases presented. Numerous cases of common occurrence will be described and illustrated by lantern slides. To simplify the presentation of this subject, impactions are classified as *partial and complete*. While it may not always be possible to assign each individual case with certainty to the class to which it belongs—owing to the different phases of the numerous cases presented—a careful study of the conditions surrounding each case will usually present enough similarities to permit a proper classification, and thus enable the operator to more readily outline the plan of operation.

### PARTIAL IMPACTION.

A partial impaction refers to that class of cases where the tooth is not deeply seated in the tissues, and where the position of the crown and its relation to the surrounding structures can usually be determined by an explorative examination, as where the eruption is retarded, a short distance from what would be normal position of the tooth by the soft tissues, osseous structures, or supernumerary teeth, or where, in case of malposition, the tooth impinges slightly on the second molar.

### DIAGNOSIS.

A correct diagnosis preceding the operation is a very important matter, as the operative procedure will be governed by existing conditions, and a correct knowledge of these conditions in each case should be obtained as a guide in properly determining the technic of the operation.

The operator, by examining the part of the crown that is visible, notes the position of the tooth as compared with what would be its normal position if fully erupted, and ascertains whether it impinges on the crown of the second molar, determining at the same time whether the gum tissue, when it partially overlies its occlusal surface,

should remain undisturbed, or whether it will be necessary to make an incision before applying any instrument to remove the tooth. The probable presence of foreign bodies of supernumerary teeth should be determined, the alveolar process should be examined to ascertain if it is in a healthy condition, the interproximal space is investigated to learn whether the blade of Lecluse elevator can be applied between the second and third molar; and the second molar, if it is in alignment, is examined with a view to using it as a fulcrum. If the operator is unable to satisfy himself as to the position of the tooth and the surrounding conditions by an explorative examination conducted without injury to the parts, a radiograph should be obtained.

#### CHOICE OF AN ANAESTHETIC.

The selection of a suitable anaesthetic should be made in order that the operation may be successfully executed.

#### PARTIAL IMPACTION BY SOFT TISSUES.

The soft tissue, which is more frequently the cause of a partial impaction than any other faction, will often, when it is heavy and resistant over the occlusal surface of this tooth, retard it at a short distance from its normal position. This tissue, when in the shape of a loose flap, often forms pockets for the reception of debris, which will continually irritate the tissue surrounding the tooth, and in most cases this condition, if of long standing, can be relieved only by extraction. Where the examination shows that the crown of the tooth is assuming a normal position, but its occlusal surface is slightly lower than the occlusal surface of the second molar, and the gum tissue, in the form of a loose flap, partially overlies the disto-occlusal surface, no attention should be paid to the soft tissue, and the extraction should be performed in the same manner as where the tooth is in normal occlusion.

Frequently the soft tissue, when it overlies the major portion of the occlusal surface, can be easily displaced, and does not greatly interfere with the application of the elevator and the raising of the tooth to a point where the forceps can be adjusted without interference from the tissue. In such case, as when the tissue partially overlies the disto-occlusal surface, the elevator is applied without severing this tissue with a lancet previous to the application. If, however, it is observed that the tissue is firmly adherent about the tooth, and will interfere with the application of the instruments and the extraction, the lancet should be used, starting the incision at the contact point with the second molar, at about the centre of the occlusal surface and incising distally far enough to expose the entire crown. In some cases, where the tissue is dense around the distal side, it is advisable to partially sever the tissue from that surface. If the operator, while

dislodging the tooth, and not having previously lanced the tissue, observes that tissue interferes with the delivery of the tooth and is liable to be lacerated, he should release the instrument and sever the tissue from about the tooth sufficiently to allow it to be released without causing unnecessary injury to the parts. When the crown of the third molar is slightly lower than that of the occlusal plane of the second molar and is inclining distally, with the soft tissue partially or completely covering the third molar, the method of operating for its removal is the same as for a like condition of the tooth not covered by soft tissue. In such case, the lancet should be applied, especially on the distal side, prior to adjusting the elevator to free the parts of this tissue, so that there will not be any interference from it during the extraction movements.

#### BY OSSEOUS TISSUE.

In addition to the eruption of the tooth being retarded by the soft tissue, the bony tissue also will retard its eruption and interfere with the application of an instrument for its extraction, especially where the alveolus extends over the occlusal surface with a bar of chisel, care being taken to remove enough process to insure extraction, which is then made in the same manner as though the tooth had not been impacted by the process.

#### BY MALPOSITION AND MALFORMATION.

Where the third molar is in malposition and the crown is slightly lower than the occlusal plane of the second molar, and impinges on the latter tooth, but its position will not prevent the application of the Lecluse elevator to the mesial surface of the crown, and the gum tissue and alveolus, will not interfere with the liberation of the tooth. The Lecluse elevator should be applied in the interproximal space between the second and third molar, and from the buccal side. When the elevator is adjusted the tooth is loosened by turning the upper end of the handle mesially, followed by a pressure downward on the handle to bring the crown of the tooth upward to a point where it can be directed distally. When the tooth is sufficiently loosened with the elevator, the forceps are adjusted to complete the extraction.

When the crown of the third molar impinges slightly on that of the second molar, but does not interfere with the introduction of the Lecluse elevator into the interproximal space, and the osseous-tissue on the distal surface of the crown is heavy, as will be shown, which is a radiograph of this kind, a part of the osseous structure on the distal side should be removed before the elevator is applied. The method of procedure is to incise the soft tissue, a little further than the point to which the operator intends to remove the long wall, after

which it is cut away with a fissure bur from the distal surface of the tooth to such an extent that, when the Lecluse elevator is adjusted for the extraction, slight resistance will be met with (encountered). Where the crown of the third molar impinges on that of the second molar to such an extent that it interferes with the introduction of the elevator into the interproximal space, and the soft tissues and the process of the distal surface of the tooth are not interfering factors, that part of the crown of the third molar that interferes with the application of the elevator is removed with a fissure bur.

Where the impingement of the crown of the second molar interferes with the adjustment of the Lecluse elevator, and the soft and osseous tissues interfere on the distal side with the delivery of the tooth, the contact point that impinges on the second molar should be cut away as described before.

Where the crown of the third molar impinges slightly on that of the second molar, and the roots of the third molar are not curved or inclined distally, the usual extraction movements, as applied with the elevator, will not always loosen the third molar. If, after the application of the elevator and the execution of the extraction movements, it is observed that these movements have no effect on the tooth, the forceps should be used, and as soon as the tooth has been loosened the elevator should be applied to continue the operation, and the forceps may be necessary to lift it out of its socket.

#### BY SUPERNUMERARY TEETH.

Cases of impacted third molar caused by supernumerary teeth are not of frequent occurrence.

The operation in such cases is very simple; the removal of the supernumerary teeth precedes the extraction of the impacted tooth.

#### COMPLETE IMPACTION.

A complete impaction refers to that class of cases where the tooth is deeply seated in the tissues and where the position of the crown cannot be determined with an exploring instrument, being described as follows:—

1. Where the tooth is located quite a distance from the occlusal plane of the second molar;
2. Where there is lack of space between the ramus of the second molar for the third molar to erupt;
3. Where the tooth is inclined, or in a horizontal position, with its occlusal surface directed toward or impinging on the crown, neck or distal root of the second molar;
4. Where the tooth is malposed in any direction, and little can be ascertained of its relation to the other tissues by explorative exam-

ination. If an extraction is attempted in any of these cases without a thorough diagnosis having been obtained, the operation has many chances of being a failure.

#### RADIOGRAPHIC DIAGNOSIS.

The diagnostic points to be interpreted from a radiograph of a completely impacted third molar are:—

1. Its position as compared with what would be its normal position if fully erupted; 2, the distance of its crown below the occlusal plane of the second molar; 3, its relative position to the second molar; 4, the amount of this surface involved if there is contact with the second molar; 5, the size of its crown and root, and the division of the roots and their curvatures; 6, the amount of the osseous tissue over the occlusal and distal surfaces of the crown and its distal root; 7, the available space between the second molar and the ascending ramus as compared with size and position of the third molar; 8, the condition of the second molar and the amount of the alveolus process supporting it. The radiograph has been a means of positive diagnosis and of justly simplifying the operation for the removal of the teeth.

#### ANAESTHETIC.

Where the operation is not difficult and will consume only a short time, nitrous oxide and oxygen should be the anaesthetic, ether can be added. In other words, the latter combination is the most suitable anaesthetic, and should be used where the operation will consume some time, or where inflammation is so extensive as to cause temporary ankylosis, or when conductive anaesthesia cannot be used.

#### COMPLETE IMPACTION BY SOFT TISSUE.

Where the tooth is deeply seated and the tissue about it is very dense, and an external examination seems to indicate that, if the eruption is complete, the tooth would be in a normal position, the operator may be tempted to immediately apply an instrument in an attempt to extract the tooth. This would be a doubtful procedure, as experience has shown that in such cases there may be unexpected conditions that would militate against a successful operation, and in all such cases, it is advisable to obtain an X-Ray, if possible, of the part, before attempting the operation.

#### BY OSSEOUS TISSUE.

Where the tooth is deeply seated and the osseous tissue is over the occlusal surface, the same technic is followed as where this condition exists, and the tooth is partially impacted.

#### BY INSUFFICIENT SPACE.

Where the tooth is deeply seated and there is insufficient space for the eruption, the crown may be directing distally and the hard tissue

partially or completely overlying its occlusal surface, or the tooth may be lying at an angle with the greater part of its crown impinging on the neck of the second molar. If the radiograph reveals that the crown is markedly inclined distally and the hard tissue is dense over the occlusal surface, it presents one of the most difficult forms of impaction encountered with this tooth.

#### BY MALPOSITION AND MALFORMATION.

Where the impaction is caused by the malposition, which is usually associated with more or less malformation of the third molar and occasionally of the second molar, the tooth may be in position varying from a slight inclination from the perpendicular to a complete horizontal position. The shape and size of the crown, shape and direction of the roots, amount of bony tissue over the distal surface of the crown and distal root, and the position and amount of contact with the second molar, govern the operative technic for its removal. The method of operating in these cases is to cut away that part of the crown of the third molar that impinges on the distal surface of the second molar, and remove a part of the bony structure on the distal side of the third molar. The part that is in contact with the second molar is cut away with a fissure fur, as in the case of a partial impaction.

#### CASES WHERE THE REMOVAL OF THE LINGUAL PLATE IS INDICATED.

Where the removal of the lingual plate is indicated, the occlusal surface of the crown of the third molar impinges on the second molar. The third molar is in many of these cases, situated in a position that at first suggests the operation described for cutting away that portion of its crown that is in contact with the second molar and removing the bony structure over its distal surface as a preliminary to its extraction, but the root of the third molar being fused and not favorably inclined upward, and hooked or rather widely separated with the septum between them heavy and dense, would interfere with the delivery of the tooth even if the process and contact points were removed.

#### TECHNIC.

An incision of the soft tissue, a little longer than the length of the roots of the third molar, is made over the lingual side of the tooth and the retractor is placed in position to hold back the flaps of the tissue. A large bar is applied to the margin of the alveolus and the process is cut away, the cutting being continued toward the apices of the roots until the process over both roots is then removed, as its presence will interfere with the extraction of the tooth.

Where the alveolar process has been sufficiently removed, the retractor is detached and the Lecluse elevator is applied to the buccal surface of the tooth with sufficient pressure to force the tooth lingually through the space that has been created for its exit.

It is advisable to remove enough of the lingual plate to permit unobstructed delivery of the tooth rather than attempt to force the tooth from its position by excessive force applied with the elevator.

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## Academy of Dentistry, Toronto, Presidential Address

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R. GORDON McLEAN, D.D.S., TORONTO.

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I WISH to take this opportunity to express my appreciation of the honour you have done me in asking me to preside over the Academy of Dentistry in this the first year of its existence. I assure you if I appreciated the honour, I more than appreciated the responsibility it involved.

We (the Officers and Council)—and just here may I publicly thank my associates for their unfailing application to the duties that were involved in the task you gave us—felt that we had the whole-hearted support of the profession in Toronto behind us. This proved an incentive that always spurred us on into giving the best we had to develop an organization that would, in time, be a power in the dissemination of knowledge—the demonstration of technique and the cultivation of friendship.

The principal aims of the Academy of Dentistry are three-fold in character, namely, to aid the members of the profession in the fulfilment of their obligations and responsibility to the public—the presentation of opportunities for the pursuit of knowledge, and the development of efficiency and the promotion of good-fellowship among the members of the profession.

Would that we could *always* keep these ideals before us in *everyday* life.

The dental profession owe to the public their *best* services, unselfishly performed. We must remember that we have the *health* of our patients in our care. As professional men, we must always say to ourselves: "What is the *best* service I can render this patient?" To me, the most striking proof that we have more than lived up to this ideal is the pronounced absence of wealth in our profession. If we *had* slipped back into the realms of trade, a position which the press have lately been urging us to take, for obvious reasons, I say, if we had allowed this retrograde movement, our attitude to our patients

would necessarily have been "How much, and what kind of dentistry can I sell this patient, so as to best increase my yearly profit balance?" *Well* do we know that if we ever did so commercialize the public would suffer both from the standpoints of health and service, as well as ultimate cost. We might gain financially—the press assuredly would—but we would lose what is more to us than silver or gold—that is, the honour of our profession where good service is placed before hope of reward.

Another object of this Academy is to present facilities for the pursuit of knowledge and efficiency. No man can stand still in dentistry. He is either progressing or in reverse gear. How near this is to public welfare. Dentistry in the last two decades has advanced in leaps and bounds. To what is this due? To individual and combined research effort and to such organizations as ours.

The success of this organization now depends upon the faithfulness of each individual member. We *must* not shirk our responsibility. We will be given opportunities to work; let us see to it that we allow *nothing* to interfere with our steady attendance at the sectional and stated meetings.

After a strenuous day it is so easy to find an excuse or be persuaded to accept a social engagement, or convince ourselves that we are indisposed, or too tired. Do not let us take the road of least resistance. If we hope to attain success we must be prepared to sacrifice ourselves. Nothing worth while is easily gained.

Everyone must put his shoulder to the wheels of progress. The faithful student of dentistry will surely find his reward—if not always in material prosperity, it will come in the acquisition of culture, the consciousness of duty well performed, and the final approbation and well done of the Great Master when his work is ended.

Again another object, and not by far the least important, is good-fellowship. Away with cliques and groups. Let every one be a friend in need and a friend indeed to every other member of the profession. We have everything in common, even to our troubles. Let us get shoulder to shoulder and smile our way through.

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## Two Per Cent Manufacturers' Tax Removed From Dental Appliances

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THE Canadian Department of Finance has ruled that Dental Laboratories are retailers, and therefore are not liable to manufacturers' tax of 2 per cent. that has been charged Dental Laboratories on prosthetic appliances for the past few years.

This ruling takes effect from December 13th, 1922.

# An Analysis of the Principal Difficulties in Modern Denture Construction\*

F. A. FRENCH, D.D.S., OTTAWA.

ONE of the greatest Englishmen of the nineteenth century has stated that "Truth is never enforced except at the sacrifice of its propounders, at least they expose their inherent imperfections, if they incur no other penalty, for nothing would be done at all, if a man waited till he could do it so well that no one could find fault with it."

That gentleman is my only defence in presenting this subject for your consideration. I have avoided as far as possible any attempt to force conclusions. My only fear is that I may be misunderstood, this being a difficult subject to discuss and still more difficult to illustrate,—I claim no originality. Many methods pertaining to prosthetic procedure have been advanced by different authorities in the past, each claiming originality, only to find out later that someone had used these particular methods many years before.

With the impression technics that we have at our disposal today, it is a comparatively simple matter, even in the more difficult cases, to construct dentures which may be worn with ease and comfort.

The real problems seem to be to construct dentures which are efficient in mastication, pleasing in appearance and which may be worn for an indefinite period without loss of tissue adaptation.

It is an endeavor to point out how these difficulties may be overcome that has prompted this work.

To insure masticating efficiency two essentials are necessary, viz: perfect adaptation of the denture base and a balanced bite.

It is just as important to have the teeth properly antagonized as it is to have the dentures properly seated.

A great deal has been written regarding mandibular movements and many very scientific articles have been and are being published in various dental journals dealing in one form or another with the so-called anatomical articulation. It has been studied and discussed from the geometrical, physical and anatomical standpoints until there exists today in the mind of the average dentist a great deal of mystery and obscurity regarding this subject.

The knowledge so far obtained has somewhat outrun the mechanical ingenuity of our articulators, while the capabilities of the best of our articulators seem to be in advance of the skill of most of the men who use them.

The opinion is rapidly gaining ground, that so far as the general

\*Read before the Canadian Dental Association, Toronto, 1922.

practitioner is concerned, the mathematics and mechanics of it are things to be forgotten. They are impractical.

It is not necessary to take a lot of complicated measurements or to use a complicated machine to construct efficient dentures for the average case.

All that the general practitioner requires is to have a good impression technic and a clear conception of just what is meant by a balanced bite.

This slide represents two opposing anterior teeth in central occlusion. When the mandible moves forward to end on occlusion the lower anterior moves along the plane represented by the dotted line.

If the second molars are set to the same plane we have established balance in the protrusive movement.

The same principle applies to the lateral movements. We know from the application of geometry to this subject that the curve of Spee may be different, so how are we to determine the curvature of the occlusal plane for a given case?

In an edge to edge set up we can have practically straight line occlusion, as the over-bite increases we should deepen the curvature, while on the other hand a considerable over-jet, as you will notice here, reduces the incisal plane and the curvature can be reduced accordingly. This illustrates the principle of a balanced bite. An unbalanced bite, besides dislodging the dentures in the act of masticating, will, by causing excessive pressure at certain points, result in atrophy of tissue under these points and thereby bring about an unseating of the dentures. This is one of the reasons why so many dentures become loose.

Some authorities claim that the occlusal planes of the cusps of the teeth should conform to the established condyle paths, while others maintain that you can establish your own cusp formation and in due time new condyle paths will be formed to harmonize therewith.

My experience in practice has been that you can do it either way and in a certain type of mouth develop all the soreness you could wish for from traumatic occlusion. Apparently one important factor has been overlooked, that there is a very definite relation between cusp form and ridge form, as well as between cusp form and condyle path.

This slide represents a cross section at the first molar region of two dentures in central occlusion. When the mandible takes a lateral excursion we find this condition. The line of force is at right angles to the cusp plane, thus giving a lateral thrust to the dentures. The lower, which as a rule has a poorer seating, naturally fares the worst. If we have a ridge formation, as in figure "A," capable of taking up the lateral thrust, all well and good, but if the ridge formation is as in figure "B," one which we frequently find, the result will be soreness here and there.

Cusps Trauma may be defined as an inflammatory condition, the result of lateral forward or backward thrust given the denture while the cusps of the teeth are in moving contact. I have corrected soreness of this nature in a number of cases by reducing the cusp formation instead of relieving the denture base.

The usual procedure in a case of soreness is to relieve the denture over the inflamed area. Where Cusps Trauma is the nature of the soreness, it will be necessary to trim enough off the denture base to prevent contact with the tissues in order to obtain relief, and the cause still exists.

Other areas of inflammation usually develop, requiring further reliefs, with the ultimate result that, between changes made in the denture base and changes occurring in the ridge form as the result of tissue atrophy, the initial adaptation of the denture base to the tissue has been destroyed.

This is another reason why so many dentures become loose in a very short time.

Tissue atrophy, with the resultant loss of denture fit, may also be caused by interference with the normal blood supply to the tissues covered by a denture, either through excessive border pressure which amounts to strangulation, or through excessive pressure over the anterior or posterior palatine foramina.

It would appear, therefore, that from the standpoint of mastication efficiency, and with a view to permanency of denture service, the essentials are perfect adaptation of the base to the tissues without interference with circulation, and a balanced bite without Cusps Trauma.

Let us turn now to esthetics and the production of a pleasing appearance in our work, so essential particularly when dealing with patients of the fair sex.

John Vanderpoole, a well-known authority on art, has said that "Rules have been laid down by which an ideal standard has been sought to be fixed, the deviation produced by age and sex being taken into account; and while such standards are more or less artificial, and not to be slavishly followed to the extent of producing an unnatural uniformity, they certainly are invaluable as expressing a mean which cannot be deviated from to more than a limited extent without transgressing the laws of nature and producing deformity."

Several well-known authorities in art, state that the anterior teeth are arranged in the arc of a circle.

It is assumed in our profession that the anterior teeth are arranged in the form of a parabolic curve. Lischer so describes them and Ottolengui also mentions this fact. Stanton claims that each arch possesses a particular curve of its own and varies with the individual. Another prominent writer states that in order to determine the shape

of the dental arch, we must take into consideration the shape of the head and face. As I see the proposition and its bearing upon prosthetic restorations, it is apparent that there is some misunderstanding as to the terms used. I believe the writer has reference to the alignment form of the teeth rather than the arch form. Arch form and alignment form have greatly been intermingled, so that one half of the profession speaks of one and has reference to the other. Prosthetically speaking, the dental arch is that portion of the mouth covered by a denture. Alignment form has reference to the arrangement of the teeth in, on, or around the dental ridge.

I do not believe it is possible for anyone to arbitrarily fix the shape of the dental arch, because nature has done that for us already. The only thing that we can do is, when abnormalities present, to alter the shape slightly through the medium of surgical interference or orthodontia.

Dr. A. A. Nelson of Detroit has shown conclusively that there is a distinct relationship between face form, tooth form, arch form, and alignment, for in nature and in edentulous patients he has noted that there is a distinct relationship between face form and arch form, especially as related to the upper arch. This being true, it necessarily follows that to produce harmony in edentulous cases we must have the same relationship between all four that we have in nature: that is to say, we must use the proper tooth form, and arrange the teeth in the proper alignment to produce this degree of harmony.

From observations and study of this subject, he has been able to distinguish three classes of arches and alignment, the same as faces can be classified. They are square, tapering and ovoid.

In the square arch the palate is usually broad and shallow, and the mandibular ridge is broad in the anterior portion, with a very slight curve from cuspid to cuspid.

In the tapering arch the palate is usually high and inverted V shaped. The mandibular ridge is very narrow in the anterior portion and presents a decided V shape.

In the ovoid arch the palate is medium high and rounded in the anterior portion of the vault. The mandibular ridge presents a graceful narrow curve from cuspid eminence to cuspid eminence.

In the alignment of the teeth please bear in mind that the chief difference takes place anterior of the first bicuspid, and reference is made only to the maxilla, as the teeth of the mandible follow the general outline of the upper.

We are not concerned as yet with the bicuspids and molars, for the reason that the posterior teeth must set over the ridge.

In the square type the alignment of the teeth from cuspid to cuspid is in the segment of a large circle, approaching more nearly a straight line than either of the other types.

From cuspid to cuspid the alignment form of the six upper anterior teeth in the tapering type is V shaped, with the incisal edges of the teeth well forward of the cervical. It has been noted as characteristic of this type that the centrals overlap one another.

In the ovoid type the arrangement of the six upper anterior teeth from cuspid to cuspid is in the segment of a small circle, smaller than that of the square. It has been noted as characteristic of this type that the laterals overlap the centrals slightly at the incisal but are slightly depressed at the gingival, leaving the mesial shoulder of the cuspid prominent. The centrals are prominent at the gingival, and in the majority of cases there is a space between the centrals.

The square arch and alignment is found in the square type of face, the tapering arch and alignment in the tapering face, and the ovoid arch and alignment in the ovoid face.

I am referring to the pure types. There are blends of these types, and especially is this true of the alignment form. In this regard Dr. Nelson states that there are three distinct types and three blends of these geometric outlines. The blends are the square with the tapering, the square with the ovoid, and the tapering with the ovoid. Do not misunderstand this. He does not wish to force the conclusion that the arrangement of teeth should be stereotyped into these alignments.

He is merely presenting basic outlines from which we may start our composition. The deviations are what constitute individuality, just as the portrait artist blocks in all heads alike, using the Greek ideal as a basis from which to start.

Some men contend that there should be other alignment forms, as, for example, the blending of the square and the ovoid in which the square would be dominant, and the same blend of type in which the ovoid would be dominant. This is nothing more or less than a slight deviation from the pure blend, and in those cases, to accentuate this domination of a certain type, I would use a dominant type of tooth with the blend. For example: in the square ovoid blend of face, in which the square type is dominant, I would select a tooth from the square class, and would begin arrangement from cuspid to cuspid along the pure alignment blend, working in such deviations as I desire to produce individuality.

As regards artificial teeth, the opinion is steadily growing that there are too many modifications of the pure type of tooth, as well as too many sizes of these modifications.

I believe that we could limit the forms to nine and have three graded sizes of these forms, as, for example, small, medium and large, which would make a total of 27 moulds instead of 52 as at present in truebyte teeth.

With artificial dentures it is possible to change a little more than one-third the lower portion of the face—that portion bounded by two diverging lines arising at the lower border of the bridge of the nose and curving downward to include the alae and the depressions on either side, portions of each cheek and including the entire chin.

This area includes the main features of expression, and any change of contour within this area will produce an effect upon the entire physiognomy and give a different expression to the countenance.

The features outside this area are known to the beauty specialist as permanent area, while those within are known as variable area. It is in this variable area that lack of harmony between its component segments, one with the other, or of the segments with the permanent area, produces the marked changes of facial contour which characterize different physiognomies.

In the preliminary examination of the face from an esthetic standpoint, with a view to harmonizing the features by supplying the correct “resisting tension” to the soft tissues with the aid of dentures, there are certain prominent features to be observed and their relative position noted in both the permanent and variable areas.

The variable area is divided into six segments, as follows:

1. The tip and wings of the nose, including the naso-labial depressions and the upper portion of the upper lip.
2. The lower portion of the upper lip or what is known as cupid’s bow.
3. The lower lip.
4. The chin in its entirety.
5. That portion of the cheek lying over the bicuspid and molars on the right side.
6. That portion of the cheek lying over the bicuspid and molars on the left side.

These six subdivisions are changeable in their relation to one another and also in their individual relation to the features within the permanent area.

It is possible to change a portion of the upper lip, the tip and wings of the nose, without changing cupid’s bow or the lower portion of the upper lip, and likewise the reverse is true.

In the study of the profiles a lack of perfect harmony is frequently noted in the position of the chin.

The lower jaw appears protruded or retruded, with the result that, either opening or closing, the distance between the arches is often resorted to when in a large percentage of cases the mandible assumes its correct relationship to the facio perpendicular line as nature intended. This is due to the involuntary action of the ligaments and the natural relation of the condyle to the glenoid fossa in

the relaxed position of the mandible. The appearance of its malposition is due largely to retrusion or protrusion of the soft tissues of the variable area.

In other words, we often err in imagining the relation of the mandible to the maxillae in central occlusion is either too open or too close because the chin is not in harmonious relation to segments No. 1, 2, and 3, when these tissues in all probability are overstrained or lack sufficient resistant tension, due to the occlusion rims inserted for the purpose of securing central occlusion.

There are three general known types of profile: the straight, convex and concave. The straight profile is the Greek ideal face and is the highest ideal of beauty. It has three points of contact with the facio perpendicular line. The frontal eminence, the middle of the wing of the nose and the mental eminence.

The convex profile has two points of contact with the facio perpendicular line: the frontal eminence and the base of the nose, the chin is slightly receding.

The concave profile has two points of contact with the facio perpendicular line: the fronted eminence and the mental eminence. The pure concave is rarely seen, but is often found modified by the straight so that the blend is frequently confused with the pure type.

In securing the relationship of the mandible to the maxilla in central occlusion, it is essential that we bear in mind the types of profile,—be able to recognize the type to which each patient belongs and strive to keep each within its normal class by not having too open or too close a relation of the jaws to one another.

We should always compare the position of the chin with the staple, permanent features of the face and the facio perpendicular line of that particular profile. In examining the profile of a patient, the most important thing is the relative position of the chin to the forehead, zygomatic arches and the bridge of the nose.

It is a noteworthy fact that very little change in the thickness of the peripheral border or the position and inclination of the teeth or slight building up or depressing of certain contours will often beautify to a remarkable degree the appearance of a face that would otherwise be quite plain and unattractive.

In the normal mouth the orbicularis oris muscle is in slightly contracted state at all times, so that any change in the underlying structure will sooner or later be followed by a similar change in the shape and size of the mouth. This is readily seen in persons wearing full dentures, when the dentures are removed the muscle contracts and the mouth becomes smaller.

In the try-in of the wax trial dentures, when the upper lip appears protruding, resetting the anterior teeth slightly back or under the ridge and thinning down the labial flanges of the wax dentures allows

the upper lip to fall into a more graceful and easy pose, leaving the nostrils less broad and open. The upward curve of the nose can be straightened and its puglike appearance removed.

If the lower lip appears protruded, the thinning down of the labial flanges of the denture and in some cases the shortening of the overjet and over-bite by raising the upper anteriors will restore the lower lip to a more pleasing position.

When the protrusion is due to the labial inclination of the teeth, with no marked protrusion of the lip or upward curve of the nose, the correction should take place in segment two. A reduction of this inclination is indicated by straightening the anterior teeth or setting them back a little farther. In other words, the incisal edge should not be too far forward of the cervical. This applies especially to the upper arch. There are numerous instances where a pronounced protrusion of the lips with a very unpleasant expression in their management is noted. Especially is this true if the occlusion of the anteriors are what may be termed end-on occlusion. The fact that the most natural occluding position of the lower anterior teeth is somewhat posterior of the upper permits the graceful curve of the lower lip which is so necessary to the esthetic perfection of the chin, providing, of course, the labial flange of the lowers does not interfere with this graceful curve.

It often happens that a slight depression of the superior portion of the upper lip, with the consequent deepening of the naso-labial depressions, gives the appearance of protrusion to the lower jaw. If the depression of segment one be not too pronounced, it may be restored by contouring and building up the cuspid eminences and thickening the peripheral margin of the wax trial denture.

This facial imperfection is quite often seen in artificial dentures and has given prosthetists quite a little trouble in its management.

The position of the bicuspid and molars, in their relation to the ridge, has a decided influence on segments 5 and 6, namely, that portion of the cheek lying over the bicuspid and molars. If the bicuspid and molars are placed outside, over or inside the ridge, or if the long axes of the teeth point in either of these directions, the contour of the cheeks will be affected, but not necessarily the anterior or labial area. Setting the laterals and cuspids in closer or directly under the ridge will invariably result in giving the cheeks a fuller contour, by relieving the tension of the muscular tissues in the anterior portion, allowing them to callopse posteriorly and thus crowd the cheek segments in the second bicuspid and molar regions. Tenting the tissues with high buccal and labial flanges is of no material assistance in the majority of cases, because the resistance tension has not been restored in the correct places.

In examining the physiognomy of a patient, the head should be in

an upright position and on a line with that of the operator, and the face studied from different angles while in repose and in action. A careful study of the face in attitudes of expression should be made with a view to determining the relative position of teeth and facial contour.

The value of a careful preliminary facial and profile examination and comparison cannot be overestimated, for it is the only guide to correct esthetic treatment.

That the laws of harmony govern the arrangement of teeth for the individual case, as do these same laws govern the selection of teeth both anterior and posterior to meet the individual requirements of the case, to my mind is a foregone conclusion, and as art in itself is real, yet nevertheless it is governed by very tangible laws which form the foundation upon which to build.

This being true, it is therefore our duty to discover just what these laws are, so that by the application of this knowledge to prosthetic restorations we may be able to construct dentures efficient in mastication and pleasing in appearance, which may be worn for an indefinite period without loss of tissue adaptation. This is the only motive for the presentation of this paper, whether you agree or disagree with me is beside the issue.

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## Focal Infection of the Teeth and Surrounding Tissues in Relation to the Eyes\*

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E. ROY BIER, D.D.S., WINNIPEG, MAN.

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WHEN your genial chairman asked me to read a paper on focal infection of the teeth to this Society, I received somewhat of a pleasant surprise, for a few reasons: pleasant because I was glad you interested yourselves in the allied professions and had considered focal infections of the teeth important enough in your work to have a brief summary presented to you; pleasant, in the second place, because of the calibre of men I am meeting with. So that I have great pleasure, gentlemen, in being here to-night.

Focal infection of the teeth was made known by the use of the X-ray machine. Dr. Hunter, of London, was the man who startled the world by his statement that focal infections of the teeth, namely, abscesses or granulomata at the roots of the teeth and pus pockets associated with pyorrhea, were responsible for 75 per cent. of the ill health of man, and that bad dentistry had innocently contributed to this percentage,—so startled the world that research laboratories all over the world have been grappling with this data. So seriously did

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\*Read before Winnipeg Oculofacial Society, November, 1911.

it occupy the minds of the dental profession that the more radical-minded men went so far as to extract all pulpless teeth whether infection existed or not. Their fear of allowing a live germ to exist in the human body caused them to become fanatical, and so perhaps in a very small percentage of our population too many teeth have been extracted; also the medical profession has a small percentage of men, whose minds are generally in a state of confusion, and hidden behind undiagnosed cases, instructing the patient to have his or her teeth removed when it was not necessary. Happy is the thought that in our profession, as well as medicine, men of this calibre form a very small percentage to-day, and are getting scarcer every day. Then, too, we are unfortunate in having the type of man in any profession who pays no attention at all to scientific data, who does the things to-day as he did in bygone days, and whose methods are as obsolete as the methods of a travelling patent medicine man who always carried spectacles as a side line, and who perhaps fitted the old lady of the farm house with a pair of glasses in exchange for his bed and room for one night; the great happy medium is the scientific correct line. Focal infection of the teeth does affect the whole system and parts remote with secondary lesions, and is an important cause of disease of the body which can never be overlooked. It does cause iritis, conjunctivitis, and even blindness, as well as duodenal ulcer, gastric ulcer, heart lesions, joint lesions, etc., kidney lesions and pus under pressure, or unerupted teeth cause secondary and direct reflexes which are sometimes obscure at first thought and require a careful and accurate diagnosis. Many of your patients may present eye strain, iritis, conjunctivitis, dimness of vision, pain behind the eye, over the eye, under the eye, or around the eye, due to direct or indirect absorption of infection of the teeth. Let us just pause and dissect the above statement.

*Eye Strain and Dimness of Vision.*—The low grade form of bacteria: streptococcus; the low grade virulent type of bacteria: streptococcus; the slowly absorbed toxin which is the by-product of bacterial strains; these may be directly absorbed by teeth situated in the front of the mouth in the upper jaw, in the region below the eye, irritation from the maxillary sinus, or absorption from the teeth in either the upper or lower jaws, the infection carried by the blood stream, and by elective localization of bacteria in proximity to the eye, may become localized and manufacture their poisonous by-products and cause any of the above symptoms.

*Blindness.*—I have only seen two cases of partial blindness, loss of one eye, other eye being good; caused from toxins of the teeth, absorbing the bone in proximity to the maxillary sinus and by direct absorption of pus under pressure, destroy vision.

*Pain Behind the Eye.*—Absorption through lymphatics or circulation.

*Pain Behind the Eye.*—Involvement of maxillary sinus.

*Pain Over the Eye.*—Involvement of frontal sinus.

*Pain Around the Eye.*—Reflex pains referred from inflammation of the second division of the 5th nerve, as well as infected condition.

First, what is the cure? You say what can I do to improve this condition? The first essential to any cure is to remove the cause, and usually the cure results by aiding nature either to recuperate or partially recuperate. Then, to discover if the teeth are infected, don't believe the patient; ask her or his dentist: has he (the dentist) had the teeth X-rayed, or is he guessing at them; has he tested them with electrical and thermal tests to make sure if they are alive? All dead or devitalized teeth require to be X-rayed and watched carefully. Whenever an abscess exists, the tooth should be extracted and the abscess removed. The mere removal of a tooth very often does not mean the removal of focal infection. Nature does not, in 75 per cent. of the cases, attach abscesses to the apices, so that when the tooth is extracted, out come roots, abscesses and all infection (or no, never). If that were so, my burdens wouldn't be quite so heavy at times. First of all, the dentist or exodontist is clever if he gets the tooth out without breaking off the roots. If he breaks it, he must often remove part of the alveolar process before he can remove the root fragment. Now, when this is accomplished he must remove the infection, either an abscess, granuloma, or cyst, by use of curettes or surgical removal of the bony septa, in multi-rooted teeth or outer crest of the alveolus, and the use of curettes. This is not a radical statement, as I have removed granulomata and cysts in patients who had all their teeth extracted 15 or 20 years previously and nature had not taken care of the remaining infection, by draining through the tooth socket. That nature is kind to us is a true statement, but our part is to assist her and make sure of our assistance by removal of infection. That focal infections of the teeth do cause systemic disturbances of any part of the human body is an absolute fact, and a truth which is here to stay. Teeth are infected in 75 per cent of the human race, and this is due to ignorance, neglect, fear, or lack of X-ray diagnosis. Many teeth are abscessed and no pain is felt. These are often the most injurious to the patient's health, due to the fact that the local resistance of the part has not enough power to wall off an infection, but it is directly absorbed into the circulation, and if the patient's chemical factory within the circulation is able to neutralize the poisons (by producing anti-bodies or by phagocytosis, or numerous other ways), no reaction is noticeable in the patient, and normal health seems to ensue. However, the day may come when,

from exposure, or a cold, or contact with contagious diseases, the patient may contract pneumonia, or small-pox, etc., then the resistance that the patient would require to regain health might be used to fight teeth bacteria and by-products, and the patient might be gathered prematurely to his forefathers. However, a sickly man, or one whose methods of living are not strictly what they ought to be, may notice quite a tired-out feeling, and have neuritis, and dozens of inflammations ending in "itis" of any organ, and if the focal infections are removed before the secondary lesions have destroyed the function of the tissue in which they have become lodged, then the patient usually makes a complete recovery. Should, however, the patient have developed a breaking-down of the cells in some remote organ, dependent upon how serious it is, and dependent upon the patient's reparative powers, just so far will the patient regain health.

Dr. Cotton, of the New Jersey State Hospital, stated that of 200 cases of iritis, 74 were due to bad teeth; examples are cited of patients who could not see, due to hemorrhage of the retina, who recovered vision upon the removal of abscessed teeth or a tooth.

In the same hospital records show that of 400 patients supposedly insane, 274 were sent home cured after the elimination of foci of infection in the mouth. This, then, is not a joke, or fad of medicine, which will pass into oblivion, that diseased teeth affect the whole physical creation of man, and that it even extends beyond the physical and affects the mental, because the two are dependent one upon the other.

What lesson can I leave with you, gentlemen, to-night? I have prepared several hundred slides; these I will show you to-night, and tell the story of the pictures. You will see I have memorized their histories and their cures, and the patients' own phraseology in many cases. The truths are evident. I have tried to leave with you gentlemen the lesson of diseased teeth. It will undoubtedly influence the success of your work to advantage. No man can live unto himself alone, or live as a thing apart, and if you would succeed in the difficult and perplexing cases, there is a possibility that a large percentage may be aided by enquiry as to the health of the patient's teeth and their surrounding tissues. When a doubt is expressed, be sure to call up that patient's dentist and try to co-operate with him for the patient's benefit. If the patient remarks that he or she has no dentist, insist upon the importance of a dental diagnosis. Others will readily give you the benefit of the doubt and a word to the wise will be sufficient. Usually the more intelligent are anxious to have proper sight.

I would suggest, then, that a closer harmony exist between the two professions for the welfare of our patients and humanity at large.

# Dentistry Under Difficulties

SCARCITY OF PATIENTS—AND MONEY.

PATCHWORK DENTAL PARLOURS.

SUPERSTITION.

BY CAPTAIN GEORGE CECIL.

AN INFINITESIMAL FEE.

**A**LTHOUGH in most parts of France and Belgium the dental surgeon thrives, he is hard put to it to save money in the war-devastated frontier areas. Indeed, the busiest and most skilled practitioner may find it difficult to make ends meet. For the aftermath of hostilities is by no means over, all being desolation upon desolation. The people still live in ramshackle huts or in houses which, having suffered from shell-fire and bombing, are patched with tarpaulins and sheets of corrugated iron. Gone are their savings, and many of them lead a hand-to-mouth existence. Consequently, money is scarce and patients few. So the dentist spends much of his time travelling from village to village, and he is forced to satisfy himself with a very small fee. Sometimes an infinitesimal fee.

These lamentable conditions apply more to the North of France than to Belgium. For King Albert's country was destined to become a province of the augmented German Empire, with the Crown Prince as its ruler. With this admirable end in view, comparatively little damage was done. But the other side of the border got pretty well shelled out of all resemblance to the original, bombs completing the wreckage. Certainly, the trenches have been filled in, and the roads, which the tank, artillery and heavy motor-lorry traffic rendered impassable, are now repaired. In many villages, however, mounds of broken masonry and mildewed rafters take the place of houses and cottages, while debris lines the streets, and the village church invariably is minus a tower.

When Germany disgorges its reparation money, and when the inhabitants of Northern France touch it, conditions may alter. At the time of writing, these unfortunate people could not be much worse off, and this is their excuse for grinding the dentist down to the lowest possible fee. Only as a last resource will they avail themselves of his services. Bridge work is out of the question—except in cases of the direst necessity. "Without teeth you cannot eat," suggests the harassed dental surgeon. "I cannot afford to eat," is the practical reply. A gold crown is almost unheard of; the most inexpensive filling is a luxury. Happily, the *dentiste* gets a fair amount of

extracting work, though competition stands in the way. The impoverished peasant, refusing to believe that only the skilled operator should be entrusted with the removal of a tooth, allows the local apothecary to operate upon him. Or a stalwart friend (with a powerful wrist) obliges, the trifling reward being a glass of rum, and an inexpressibly evil-smelling French-made cigar. Something more than the tooth may be removed, and blood-poisoning is not uncommon. The rum and the cigar prove a dangerous investment.

Every now and then the man of dental science has a stroke of luck. The lord of the manor sends for him, and he spends some days at the *chateau*, being well paid for his professional attentions. The visitor overhauls the teeth of *Monsieur*, *Madame*, and the family, the servants also submitting to his ministrations. But such happenings, alas, are none too common.

#### THE ECONOMICAL PRACTITIONER.

The Northern Railway System having raised its rates to an inflated figure, the dentist usually finds it expedient to buy a small second-hand car, which he learns to drive. The auto is big enough to carry his impedimenta; and if the weather is warm, he sleeps in the car when touring the district, thus saving the cost of an hotel bedroom, the charge for which is out of all proportion to its worth. Meals are taken at some small *restaurant-estaminet*, where a room is converted into a temporary dental parlour. Sometimes the house is little more than "a thing of shreds and patches"—thanks to the war. Glass being expensive and rare, the windows consist of oiled paper; shell-holes in the walls are covered with sacking; and the roof is barely water-tight. The flooring is uneven, and the ceiling is all cracks and dirt. The damp has got into everything.

But the unattractive dental parlour answers the purpose, while the simple-minded patients do not ask for anything better. Besides, two or three francs cover the hire for the whole day; and this detail, like sleeping in the car, has to be seriously considered, when the practitioner may not be taking more than from fifteen to eighteen hundred francs a month. Indeed, many a dentist has to content himself with a thousand. After deducting the necessary expenses of his profession, there is none too much left for rent, food and clothes. Little, if anything, can be put towards the proverbial rainy day.

Occasionally the mayor proves to be a friend in need, placing a room in the *mairie* at the disposal of the dental surgeon. As glass windows are a specialty of the town hall, a proper light is assured, and the accommodation is free.

#### WHERE GAS IS NOT POPULAR.

Sometimes the dental surgeon runs short of cotton-wool, and even of a local anaesthetic, when miles away from a pharmacy. He may

be attending to patients in a village where the chemist (a most ignorant person) has never even heard of such things. So far as an anaesthetic is concerned, it does not very much matter, for such is the extraordinary superstition of the peasants in certain wild districts that they jib at an injection. As to gas, this is not popular; 'tis considered a survival of witchcraft, and anything uncanny is held in horror. "Do your worst," says the heroic martyr. "But spare me all jiggery pokery business."

Occasionally a French dentist, greatly daring, ventures into Belgian territory. The visit is not, however, welcomed, since Belgium and France do not esteem each other. For the same reason the Belgian practitioner who crosses the border soon finds it advisable to return. Neither makes a fortune in his own country; but they are assured of a welcome from their compatriots. Elsewhere, suspicion follows them, and nothing will allay it. Nor does the German on the eastern frontier place himself in the hands of the Belgian dentist. Contending that the last-named does not know his business, he returns to Germany, where the dental surgeons certainly are most capable. The Belgians, who are as much German as anything else, resent this unfriendly attitude. They resent in vain.

At Menin-Halluin, a little war-wrecked frontier townlet, which is half French and half Belgian, a tiny stream dividing the two countries, both nationalities are represented by a dentist. There scarcely is enough work for one man, but patriotic feeling demands two. Their joint earnings amount to a trifle.

Rue des Pyramides, Paris.

GEORGE CECIL,

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## Michigan State Meeting Announcement

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**D**ATES—March 27th-31st, 1923.

At Detroit, in the Cass Technical High School building. Michigan, this year, is going to put on the most intensive and instructive programme that has been attempted by any State or combination of States, and wishes to advise all members of the American Dental Association and the Canadian Dental Association that we will have *real co-operation* in dental educational matters during that week.

There will be four distinct programmes:—

1. Dentists.
2. Dental Nurses, Hygienists and Assistants.
3. Dental Technicians.
4. Dentists' Wives.

These programmes will be on different floors, and will not interfere one with another.

The Detroit Dental Clinic Club will demonstrate the subjects of:—

1. Prosthodontia (Full and Partial.)
2. Crown and Bridge.
3. Principles of Cavity Preparation for Gold and Porcelain Inlays.  
Principles of Impression Taking, Model Making and Articulation of Inlays and Crowns.
4. Porcelain (Crown and Inlays.)
5. Preventive Dentistry.
6. Root Canal Surgery.
7. Oral Surgery.

An essayist from outside the State will read a short, snappy paper on each of the subjects demonstrated by the Clinic Club.

Essays on the subjects of Conductive Anaesthesia, Diseases of the Jaws Influenced by Radium Therapy, the Possible Value of Pre-dental Education and the Value of Co-operation Between the Dentist, the Manufacturer, and the Distributor, will be read.

Each essayist will clinic the subject matter of his clinic. We believe that each essayist should be available to the attendants so as to clear up questions, and so that the attendants can discuss with the essayist, as an individual, thereby not necessitating the attention of the entire assembly at the time of the delivery of the essay.

A historical exhibit will be one of the features, more than worth while. Doctor William Bebb, Professor of Comparative Dental Anatomy, librarian and curator at the Northwestern University Dental School, will bring a complete exhibit of the subjects to be demonstrated by the Clinic Club, will be a part of the section when demonstrating, and will interest the attendants in the history of the subject up to the present date.

Dostor Bebb is noted the dental world over in this interesting field, and is very enthusiastic. The exhibit will be the most complete and extensive ever shown outside the museum.

The Defensive-Diet League of America will be in attendance. This is a league that is interesting itself in properly balanced diet for us and our patients. Mr. G. E. Harter, manager of The Dental Summary, will be in charge of this exhibit, and it will be very instructive. A great deal of time has been spent in this very interesting study, and the results in practice are often quite marvellous.

The general clinics will be given in the old-fashioned way—a free-for-all arrangement, whereby the attendant may pick his clinics and move on at any time.

The best men from all parts of the State are being secured as clinicians.

The spacious laboratories and recitation rooms afforded by the Cass Technical High School will give the clinicians unusual facilities which they heretofore have never enjoyed. It is planned that all subjects in dentistry will be demonstrated so that each attendant will get all of every phase of dentistry that he is looking for.

*The Building* is very conveniently located; seven minutes' walk from the hotel centre of the city.

It has seven floors (550,000 feet of floor space).

Five passenger elevators make very speedy and comfortable transportation.

The auditorium has seating capacity of 3,065, and is fully equipped.

Eight large assembly rooms.

Eighty-five recitation rooms.

Several amphitheatres.

Every laboratory facility that could be wished for convenience of clinicians and demonstrators.

Lounge rooms on each floor for both men and women.

The dining-room is a wonderful place. Seats 1,200 at one time. Food will be served at cost, noon and evening. Cafeteria service.

A dinner dance will be held at the Statler Hotel on Thursday evening, March 29th, 1923, in honour of Doctor and Mrs. William A. Giffen.

One and one half fare transportation rates have been arranged for from all parts of the United States, on certificate plan.

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#### THE PROGRAMME IN BRIEF.

##### Tuesday, March 27th, 1923.

A.M.—Essays by M. M. House: Prosthodontia. W. E. Cummer: Partial Dentures. Wm. L. Shearer: Surgery.

12.30—Noonday speaker.

P.M.—Demonstrations by Detroit Dental Clinic Club. Full Dentures, Partial Dentures, Wm. A. Giffen, Director.

Evening.—R. Ottolengui: Simple and Cystic Pericementomas and the Effect of Electrolytic Medication Thereon.

General clinics by Michigan men.

##### Wednesday, March 28th.

A.M.—Clinics by essayists. (We believe that the time of the general assembly should not be taken with discussions, so each essayist will be available for discussions with individuals on this morning.)

12.30.—Noonday speaker.

P.M.—1 o'clock essay, Sam. L. Silverman: Conduction Anaesthesia. Balance of afternoon is exhibitors' half-day.

Evening.—Public meeting in auditorium. Nationally-known public man for speaker. We feel at present that we will be able to arrange with Arthur Brisbane.

##### Thursday, March 29th.

A.M.—Essays by Henry W. Gillett: Indirect Inlays. Fred A. Bricker: Preventive Dentistry.

12.30.—Noonday speaker.

P.M.—Demonstrations by Detroit Dental Clinic Club. Principles of Cavity Preparation for Gold and Porcelain Inlays; Principles of Impression-Taking, Model-Making and Articulation of Inlays and Crowns, E. B. Spalding, Director. Preventive Dentistry, Grace Spalding, Director.

Evening.—Dinner dance in honour of Doctor and Mrs. William A. Giffen, at Statler Hotel.

Otto U. King, speaker of the evening.

#### Friday, March 30th.

A.M.—Essays by C. C. Sparrow, Crown and Bridge; George A. Thompson, Porcelain; Frank H. Taylor, Co-operation Between the Dentist, the Manufacturer and the Dealer.

12.30.—Noonday speaker.

P.M.—Demonstrations by Detroit Dental Clinic Club. Crown and Bridge, Wm. H. Elliott, Director; Porcelain Crown and Inlays, A. L. Le Gro, Director.

Evening.—R. E. Loucks: Diseases of the Mouth and Jaws, Influenced by Radium Therapy. General clinics.

#### Saturday, March 31st.

A.M.—Demonstrations by Detroit Dental Clinic Club. Root Canal, Raymond L. Girardot, Director; Surgery, Don. M. Graham, Director.

There will be a complete programme for the nurses, hygienists and assistants, technicians, and for the dentists' wives. Committees are enthusiastically working on the details.

Miss Edith Constable, who is in charge of the Board of Health nurses, is in charge of the Committee for Nurses, Hygienists and Assistants.

A. A. Nelson, the well-known prosthodontist, is in charge of the programme for the Technicians.

Mrs. Wm. R. Alvord, past president of the Michigan Federation of Women's Clubs, is in charge of the programme for the dentists' wives.

These Committee heads are very ably assisted. The completed programme will be published later.

Michigan is particularly keen this year to have real audiences for these meetings, and is putting enthusiastic effort into the arrangements.

Arrange your appointments so that you may be with us all week.

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TREATMENT OF CARCINOMA OF TONGUE.—The primary lesion should be managed entirely by the use of radium. The use of buried emanation in weak tubes uniformly distributed throughout the growth is by far the method of choice. Cervical nodes should be treated conservatively by external radiation where neck is free from palpable involvement, and then, should metastasis appear, the treatment of these should be by external radiation, followed by a complete neck dissection, under local anaesthesia, coupled with use of radium emanation, in very weak tubes buried throughout the wound—*Dental Record*.

# The Duties of a Dental Assistant

BY IDELLA BREAKSTONE, CHICAGO, ILL.

**A**DVANCEMENTS made within recent years in the practice of dental and oral surgery have brought about a larger field for the dentist than ever before. In the majority of instances this has necessitated the employment of a competent woman assistant.

The duties of the assistant are many and varied. She must be efficient, as is expected of everyone in the business world, and must have definite qualifications fitting her for this technical position. She should be tactful and courteous in her dealings with the patients at all times.

The assistant should be trained to quickly grasp and anticipate the wants of the dental surgeon in his operations, so as to be of the utmost help. In a word, she should be to the dentist what the assistant in an operating-room is to the surgeon. A technical knowledge of dentistry is very essential, especially the mechanical side. The assistant should be able to mix cements, synthetics, alloys, pour models and cast inlays and to polish them. To do this saves a great deal of time for the dentist, which makes for greater efficiency.

The assistant should also understand the nature of each operation, whether it is to be a filling, extraction, or prophylaxis, so as to have the necessary materials and instruments in readiness. If the dentist is to prepare a cavity for an inlay, the cutting instruments should be on the tray in order, the wax heated for the impression, the temporary stopping and plastic instruments at hand, so that the dentist will not have to leave the chair. This service can only be given by careful observation on the part of the assistant and co-operation on the part of the dentist.

## APPEARANCE OF THE OFFICE.

The general appearance of the office is of great importance, as this is the first thing seen by the patient, and therefore leaves a lasting impression. Everything about the office should be clean, including the uniforms of both the dentist and the assistant. All instruments and materials not in use should be out of sight as much as possible, and all cotton and gauze which has been used should be completely out of sight, preferably in a closed receptacle. A fresh and sterile towel should be used with each patient, and all appointments at the side of the chair should be spotless.

## STERILIZATION OF INSTRUMENTS AND TESTS.

One of the most important things to know in a dental office, and one that is least known by the average assistant, is the procedure of sterilizing dental instruments. It is well worth the assistant's time to know at least the rudiments of this vital subject.

—*Item of Interest.*



## To the National Dental Association and Return

*(Continued from January Issue).*

### JASPER PARK.

THIS Government reserve is a vast territory in the western part of Alberta, 4,400 square miles in extent, which, I am told, makes more than 2,800,000 acres—quite a breathing place. It is a paradise for wild game, and the Government has made a wise provision in prohibiting shooting within its domain. Thus there is a notable increase of wild life in this territory, and the overflow into the surrounding regions, where shooting is permitted, furnishes a fertile field for the enthusiastic sportsman. Jasper Lodge is located about three miles from the station, and is situated on beautiful Lake Beauvert—a clear body of water, so clear and clean, in fact, with such an absence of vegetation, that it is said no fish will live in it. The main lodge consists of an office, a dining-room and kitchen, and a dance hall. For sleeping quarters there are rows of log bungalows along the shore of the lake, with running water, hot and cold. They are very comfortable.

Hiking and horseback parties, under escort of competent guides, leave the Lodge for the various mountain trails and other points of interest. We took an automobile to the summit of Maligne Gorge, about six or eight miles from the Lodge, where we saw the water rushing down through a cleft in the rocks, sometimes 300 or 400 feet below us, with a drop of 700 feet in half a mile. It is wild and glorious in the extreme. We were there through the latter part of July, and in one cleft there was still an immense mass of snow and ice. The guide confided to me that he was going to be at a loss to know what to do to create a sensation among the ladies when this snow finally melted, but I assured him that I did not believe it would melt very soon—there was too much of it.

At the summit of the gorge there was a fire ranger's log cabin,

with his splendid horse standing outside, saddled and ready for any emergency. The ranger was a university graduate, who liked this kind of life.

They have between fifty and sixty saddle and pack-horses at the Lodge, and they are turned out at night and rounded up next morning. In the fall, when the season is over, the band is let loose to fare for themselves during the winter, and rounded up in the spring. They range sometimes as far as fifty miles, and it is no small task to get them.

Across the lake from our bungalow there was a beaver house, and, on strolling around to another part of the lake, we came upon a larger house, and saw some trees that had been cut down by the beaver. There were some wild ducks swimming around, a short distance away, and all at once we heard a terrible quacking among the ducks, and saw them scurrying toward the shore. We soon saw the cause of their excitement in the form of the head of Mr. Beaver swimming across the lake. Bears are also very plentiful in the Park, and, in fact, are sometimes too friendly with the campers' provisions. Everything eatable must be kept out of their range or it will be stolen. They sometimes come down to the garbage heap back of the Lodge, which reminded us of the bears we saw in Yellowstone Park years ago.

From the Lodge, on a clear day, may be seen the noble dome of Mount Edith Cavell—a fitting memorial to devotion and martyrdom. Mount Robson, a higher peak, is further up the line.

The Superintendent of the Park is Colonel Rogers, the veteran of many campaigns. His residence and official headquarters are located in one building near the station at Jasper Park. It is built of stone, and is artistic in the extreme. I had been told by my good friend, Dr. K. C. Campbell—I think he came out of the army a Major or



Maligne Gorge, where the river drops through a chasm in the rocks 700 feet in half a mile.



Totem Pole at Jasper Park Station.



Party starting out for a mountain ride from Jasper Park Lodge.

Colonel—formerly of Winnipeg, to be sure to call on Colonel Rogers, which I did. I found him a fine gentleman of the genuine type, with a home that was a treasure-house of trophies of all sorts, from military to mountain sports. I have never seen a more beautiful collection of heads and other specimens, gathered in a long career as a soldier and sportsman. Others might profitably put in hours studying this unique display, and as I went to sleep that night in the train I still had mystic visions of the delightful Colonel and his stuffed and mute menagerie. Long live Colonel Rogers!

I awakened next morning near Edmonton, where the train was to stop for half an hour. It was 6 a.m. on Sunday, but at the station to see us were Dr. Howard Whittaker, and that very dear woman, his wife, with their boy, Bruce. We had seen no one but strangers for days, and it was like a breath of Heaven to meet these good friends of ours and have a little chat. (I hope they went back comfortably to bed, and had their Sunday morning sleep—bless their hearts.)

Running that day through Alberta and Saskatchewan, we saw literally thousands of wild ducks. On every lake, even those which were skirted by the railroad, the ducks swam as contentedly and fearlessly as if they were tame and in a farmer's barnyard. But, ladies and gentlemen, wait till the nippy days of autumn arrive, and the morning mists are cleaved with the ring of the sportsman's gun, and those same birds will be as alert and wild—well, as alert and wild as a hunted duck, and I know of nothing more alert than that.

We arrived in Winnipeg Monday forenoon. I had purposely refrained from sending word to any of our friends on account of previous experiences in that city, when the dentists have cancelled their appointments and devoted themselves so unselfishly to my entertainment that I have suffered a real embarrassment. If there is anything that pricks my conscience it is to interfere with the professional duties of any of my friends, and so my intentions were perfectly good when I entered Winnipeg. But I reckoned without my host. The only way I can get through Winnipeg decently and with a clear conscience is to go through in the night with the blinds down. But I felt it would be too shabby a procedure to stop off at Winnipeg without making a call on a few of my friends. I might have known better. The first man I called on was naturally Dr. W. F. Taylor—"Bill" Taylor—and that was my undoing. He backed me up in a corner, and said some things to me that were not complimentary to my courtesy and common sense in not sending them word that I was coming. I tried faithfully to apologize, but he landed harder than ever—Bill is a tartar when he gets started. I introduced my daughter and her husband, who had called with me, and that made matters worse. They all seemed to like each other from the very first, and

before I could protest, some plans were being formulated for the day. I made an excuse to get away, and said I wanted to go over and see Dr. A. L. Bannerman—"Les" Bannerman. Bill acquiesced, but I thought there was something mysterious in his demeanour. As soon as we called at Dr. Bannerman's office, he turned to the patient who was waiting for him and said he expected to come down with small-pox that afternoon, and dismissed her. Then something happened. "Les" took out his keys and began to open up his storehouse of rare furs, Indian relics and handicraft. I thought that girl of mine would lose her eyes, and I thought that boy of mine would die on the spot. I had seen something of this collection before, but Dr. Bannerman has added to it until it is today the finest collection that was ever brought together by a private individual. If anyone thinks I am exaggerating, let him go to Winnipeg and see for himself. He has the rarest furs I have ever looked upon or ever expect to look upon again. And he has the most exquisite handiwork of the native women of the north that the ingenuity of man can imagine. It is colored silk work on buckskin, quill work of the most artistic designs, embroidery—but I must not try to describe it, because I shall make a botch of it. Go to Winnipeg some time and see it. It is worth a trip across the continent to just look upon it. And he has such a wonderful variety of it. No one who has not secured the perfect confidence of the Indian, the Hudson Bay men, and the Northwest Mounted Police, could ever have gathered such a collection, and it should some day go into a museum of nature and of art. But it should never be divided. It should be kept together in its entirety, and known as the "Bannerman Collection." I confess that I have never been more profoundly impressed than I was that day in Winnipeg in Dr. Bannerman's office.

I had planned to call on my old friend, Dr. Geo. F. Bush, one of the sturdy wheel horses of the profession in Manitoba, and so we tore ourselves away from that alluring spectacle of furs and fancy work, and went up the street to the Sterling Bank Building, where Dr. Bush has his office. We had only begun to enjoy a pleasant chat when those two benevolent Indians, Bill Taylor and Les Bannerman, appeared on the scene and captured us bodily for a ride in an automobile. They drove us out in the country along the historic Red River, about twenty miles, to Lower Fort Garry. They could not have pleased us more. In all my visits to Winnipeg, I had never before been to the Fort, and I had always wanted to see it.

The building was begun in 1821, and the surrounding walls, enclosing about five acres, with the four round-tower bastions, were completed in 1839. There are so many delightful traditions clinging around this famous old fort that one loves to linger and "mull" over them. The place is now occupied by the Motor Country Club, and

is, therefore, being well kept up. It was the first stone-and-lime constructed residential building in Western Canada, and within its walls in the halcyon days of the fur trade, there probably was transacted more important business, both of a commercial and diplomatic nature, than was transacted in any other centre of the great Northwest. Today these old stone buildings, with the sturdy surrounding walls four feet thick, with loopholes for rifle fire, stand as mute monitors of the good old days of brawn and brain, when the destinies of the far-flung northern empire were being moulded. Volumes might be written on the romance and reality of this delightful old spot, and I count it a rare privilege that I was permitted to visit it under such favorable auspices.

We had a most delicious luncheon, and loitered around the grounds—having our pictures taken, and inspecting the various buildings and bastions till the time came for us to motor back to the city. We crossed the river and drove through a district which I never dreamed was in existence in Western Canada. It was inhabited



One of the corner bastions at Fort Garry. The two benevolent Indians at the right are "Les" and "Bill." The others are just plain ordinary Frontier folks.

Our Bungalow  
at  
Jasper Park.

by as foreign a population as if it were in mid-Europe. It consisted of Poles, Lithuanians, Russians, etc., and the whole atmosphere of the place was as unfamiliar as if we were travelling by a river in one of the Balkan states. The buildings were small, but clean, and most of them freshly painted. Some of the color schemes were unique and vivid, running from various shades of yellow to pale blues.

We reached the city in time to see the employees coming out of the various stores, and as we sat in front of Eaton's I was most forcibly struck by the wonderfully fine appearance of the girls who came out of that establishment. They were well-dressed, clean, neat, and apparently as fresh as if they were just going to work in the morning. In Chicago, the employees coming out of our large retail houses look tired and worn. I remarked this, and Dr. Taylor informed me that

in Winnipeg the stores close Saturday afternoon the year round, and during the summer months they close all day Saturday—making a five-day week. The working conditions are also made very favorable for the employees, which accounts in large measure for the splendid appearance of the girls. It would be better for the coming generations if these conditions prevailed in all our large establishments.

We were to have dinner at the Fort Garry Hotel, which was convenient to our train, and when Dr. Taylor escorted me upstairs, I was taken off my feet to find about twenty-five of the Winnipeg dentists seated around the table. They had been gathered together after we reached town that forenoon. Verily, the ways of the Winnipeg men are past finding out. The train was to leave at 8 p.m., so I had only a few minutes in which to try to express my appreciation of the splendid courtesy shown me that day in Winnipeg, and to thank those who had gathered on so short a notice to make me feel at home in their midst. Meanwhile Dr. Bannerman had spirited that boy and girl of mine away to dinner and to another visit to his office. As we took the train that night there was a very mysterious air about the two members of my family who had been out with Dr. Bannerman, and it was not till we were snugly settled on the sleeper that I was informed that their host had given them some very beautiful souvenirs from his collection to take home with them. They are prouder of those souvenirs than of any other of their earthly possessions, and our friends in Chicago have had recited to them over and over again the wonders of Dr. Bannerman's collection, and have been shown repeatedly the souvenirs as concrete examples of it.

It is impossible for me to speak at this time, or at any other time, in sufficient appreciation of the splendid entertainment meted out to us by the men of Winnipeg. Sometime in the future, when a new set of adjectives of much stronger declension are introduced into our language, I may make the attempt. But now I stand altogether helpless before the impossible task.

Running from Winnipeg to Duluth, we passed through Virginia, Minn., where are located the mills of the Duluth and Rainy Lake Lumber Co., reputed to be the largest white pine lumber mills on the continent, with a capacity of more than a million feet per day. Looking in every direction from the train, the water was filled with logs, and the land covered by lumber.

At Duluth we had planned to slip in and out quietly, and I had not notified a dentist of our arrival. But a little mouse must have squealed some place, because we found at the train to meet us Drs. Bettenhausen, Goering, Peterson, Baustert, Northfield, and Irwin. The day in Duluth was a fitting climax to a long and interesting trip, and we were entertained right up to the moment of our departure. Dr. Bettenhausen performed a feat that day that I have never seen

equalled. He was driving us in his car on one of the upper streets, when suddenly the gas gave out. "Give me a little shove," he said to the boys in the car. They did so, and he turned the head of the car down the street, and coasted two blocks and a half to a gasoline station. It is sometimes convenient to have hills in a city. But the Doctor recited to me even a more interesting experience than that. He was driving along one evening about five miles out of Duluth when a strange-looking animal loomed in the distance. Just as the car came up the animal swerved around and hit its head against the windshield, shattering it to bits and breaking the animal's neck. It turned out to be a moose, and Dr. Bettenhausen had it butchered and distributed among his friends. Some men make the most elaborate preparations, and travel great distances to gain the distinction of killing a moose, while here is a man who merely drives a few miles out of town, and knocks one silly with his car.

Some day I am going to Duluth, and pay those boys a longer visit—I want to see more of a body of men like they are.

We reached Chicago the following morning, having travelled a little more than 7,000 miles in about three weeks—fourteen nights of which were spent on a sleeper, and three on the boat. There was not a dull moment on the trip, and not a regret for any part of it. But the greatest value of a trip like that is the fact that for years afterward, it is lived over again bit by bit, as incidents are recalled, and the delightful personality of the different people we have met comes back to us again and again. We get much out of our memories, and he is fortunate in this life whose memories are mostly pleasant.



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### Press Bulletins to Be Issued by Ontario Dentists

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THE Board of Directors of the Royal College of Dental Surgeons, and the Oral Hygiene Committee of the Ontario Dental Association, are uniting for the purpose of conducting an educational campaign in the interest of public health, through the publication of a series of bulletins upon the value of the teeth, the care of the mouth, and the relation of the teeth to bodily health and disease.

These bulletins will be published in the daily press of the Province, appearing weekly for a period of about three months, beginning about the middle of February.

# MULTUM IN PARVO

This Department is Edited by  
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HELPFUL PRACTICAL SUGGESTIONS FOR PUBLICATION, SENT IN BY MEMBERS OF THE PROFESSION, WILL BE APPRECIATED BY THIS DEPARTMENT

**A USEFUL HINT IN CASTING WORK.**—The method described below does not appear to be as widely known in this country as it is in France, and we, therefore, think it would be of interest to publish the descriptions which have been communicated to us. It is of value in those cases in which casting is particularly useful; for instance, a partial upper, a porcelain-faced crown, a bridge, and in those cases in which flat backlong pin teeth would be used. The method is as follows:—

1. After waxing up on the model and placing flat backlong pin teeth in the wax, with the pins straight, withdraw the teeth after all fitting has been done and the wax has been properly contoured and built to protect the incisal edges of the teeth.

2. Insert graphite sticks, of the same size as the pins, into the holes in the wax where the pins have been.

3. Invest and cast.

4. With a fine bur, drill out the graphite sticks.

5. With a fine bur, serrate the pins, and roughen or serrate the holes in the cast gold.

6. Cement the teeth on. Advantages of Method. 1. Teeth not exposed to the casting, hence no discoloration. 2. Strain upon the porcelain, relieved by protecting the incisal edges of the teeth with gold. 3. Easy to repair.—*Dental Magazine, London.*

THE FOLLOWING IS AN EXTRACT from a letter written thirty years ago, showing that at that early date there was evidence of the fact that the dentists were questioning the possibility of there being a connection between diseased teeth and a remote lesion in some other part of the body. The letter was written by Mr. W. Bowman Macleod, Dean of the Dental School and Hospital, Edinburgh, and had been addressed to a friend in Sydney, N.S.W., who sent it for publication in the *Dental Science Journal of Australia*:—

“By the way, I had a most interesting case at the Royal Infirmary a fortnight ago. I was consulted by the surgeon in charge regarding

the case of an epileptic, a lad of about 20 years of age, whose case had withstood all the usual remedies. He had some bad teeth, and it was thought these might at least aggravate his trouble. I found his teeth in a deplorable state, and on getting his history, suggested that they might be at the bottom of the whole disease. What led me to this conclusion was that he had his first fit when about 7 years old. His six-year molars were in a bad state, and had evidently decayed immediately on eruption. They were defective in structure. His fits had been progressive, becoming more frequent as he increased in years and as his teeth were attacked with caries. On touching one of his six-year molars he took a fit. This corroborated the deduction, and I recommended that he should be chloroformed and all decayed teeth removed. This was done a fortnight ago, and he has not had a fit since, whereas he used sometimes to have two or three in a day. He has also improved in general health, bodily and mentally. So far, so good; but we must yet wait awhile before we pronounce a decided opinion."

**SPEECH RESTORED BY TOOTH EXTRACTION.**—Three years ago Mrs. B., about forty-two years of age, came to my office for the extraction of a badly-diseased upper right first bicuspid root. Mrs. B. was brought to me by another patient of mine, who asked me to perform this operation. I was rather astonished at the reticence of the patient, and, upon enquiry, was told that she lost her speech suddenly about two years previously.

After making a thorough dental examination, I found that there was no need of any X-Ray diagnosis, as her mouth was in a very filthy condition, and, after explaining the matter to my patient's spokesman, and with the aid of the sign language and gestures, she permitted me to extract what remaining teeth and roots she had in her upper jaw.

The operation was completed at one sitting, and I was astonished that in a very short time after the operation she was able to speak almost as well as she did five years ago.

It is now three years since her teeth were extracted, I having followed her case with interest. She can talk as well as ever now.

The only way I can explain this fortunate result is, as I thought then, that the more or less diseased dental innervation of the upper teeth may have acted reflexly on the laryngeal nerve mechanism.—*H. A. Gordon, D.D.S.*

**CLEANING A VULCANIZER.**—By putting a piece of zinc in the bottom of your vulcanizer and adding one teaspoonful of salt, the pot and flasks will remain perfectly clean. (No trouble).—*Dental Surgeon.*

THE ETIOLOGY OF ADENOIDS.—Dr. Harry Campbell writes as follows to *The Lancet*:

"In view of the alarming prevalence of adenoids in this country, it is greatly to be regretted that the pathology of this disease has not yet been definitely settled. In his paper on the subject, published in *The Lancet* of November 12th, Dr. H. Merrall emphasizes the part played by oft-repeated colds in the etiology of adenoids. Doubtless he is right here. But this is not the beginning of the story. Why these oft-recurring colds? Are they not the result of the status catarrhalis so ably described by Dr. H. C. Cameron, a condition which is, in large measure at least, the result of improper food? Unfortunately, in a large proportion of the medical problems which confront us, the data at our disposal does not admit of a logical conclusion; we have to be content with hypotheses, but I venture to suggest that as regards the etiology of adenoids, a logical conclusion can be arrived at. Thus:

"Adenoid disease is more common among the British than among any other people. Wherever the British settle, be it in Australia, New Zealand, South Africa or Canada, there adenoid disease is rampant among the British children. This cannot be because the British are hereditarily more liable to adenoid disease than other peoples, since there is evidence that the British of not many generations back did not suffer from this disease. The one material environmental factor common to the British settlers in various parts of the world, but not shared by other peoples, is the food: the British take their dietetic customs with them wherever they go.

"Ergo, a cause of adenoids is to be sought for in the nature of the British dietary.

"If there is a flaw in this argument I should be glad to have it pointed out.

"Cease to feed children on an excess of sugar and soft, starchy foods, and I venture to predict a pronounced diminution in the present disastrous prevalence of adenoids among us."—*Dental Record*.

ARTICULATING ARTIFICIAL TEETH.—After an upper and lower set of teeth have been articulated and fitted to the mouth, any little prominent points upon the cusps will more or less destroy the usefulness of the case, since they will cause a slight displacement of the lower denture during the movement of the mandible. In order to obtain perfect contact at every point, the teeth should be ground with carborundum crystals, mixed with a little oil or glycerine. To do the work successfully, paint the surfaces of the teeth with the paste, and work them together laterally while in position upon the articulator. The resulting smoothness gives to the patient a freedom of action which can be secured in no other way.—*Dental Surgeon*.

# JUVENILE JINGLES

*Contributed to ORAL HEALTH by Dora L. Cameron,  
Wenatchee, Wash.*

## BODYGUARDS.

Bodyguards are watching,  
Stand in two straight rows,  
Watching very carefully  
What inside them goes.

Do not want to hurry—  
Must have lots of time;  
Swallowing big pieces  
Is a dreadful crime.

So, to save the baby  
Every pain and ache,  
They guard very carefully  
Every bite we take.

All they ask for working,  
All they want for pay,  
Is that they're cleaned always  
Three times every day.

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## GOOD RESOLUTIONS FOR 1923.

Resolved, that I'll be dressed by eight,  
And never once for school be late;  
That I'll not hunt for cake or pie  
Or ever eat it on the sly.

That I will never read in bed,  
For that is wrong, my mother said;  
That I will always be polite  
In doing kind things take delight.

I'll lift my cap when on the street  
My mother's friends I chance to meet;  
Now, these are only just a few  
Of the good things I hope to do.

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## EATING THE SNOW.

I know a dreadful thing  
Some little children do  
It's pick the snow up off the street  
And eat it—this is true.

It's just as dangerous as can be,  
Because they never know  
What filth, and often bad disease,  
Is hidden in the snow.

A Snow Man is the only one  
Who lives on snow you see.  
It's very bad for boys and girls;  
It's dangerous as can be.

# ORAL HEALTH

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TORONTO, FEBRUARY, 1923

No. 2

## EDITORIAL

### Why So Few Dentists Become Millionaires

THIS ever-recurring question has often been heard coming from the ranks of every profession, and perhaps never more frequently or more insistently than today. Within the ranks of the dental profession we have those who cannot understand why men in other walks of life, men of no particular outstanding ability, can boast of an annual competence many times in advance of the dental practitioner in good repute.

The answer to these questions and remonstrances is one that deals with the fundamentals that distinguish the professional man from the business man.

The ideals and ambitions of the truly professional man can be summed up in the one word—SERVICE. If he is a member of the healing profession, his whole mentality will be engrossed in the all-absorbing problem of giving relief to suffering humanity. To such men the financial recompense becomes a secondary consideration. The life story of the really great men in medicine and dentistry, from the time of Hippocrates down, goes to prove the truth of this statement. They have willingly given of their years and their skill, that some of the vital problems relating to disease and health might be brought nearer a solution. Compare, if you will, the careers and services of

such men with the keen "practical" business man whose whole energy is concentrated on the one problem of building up a prosperous and lucrative enterprise.

Between these two classes, as one can readily see, "there is a great gulf fixed." The hard-headed man of affairs cannot successfully cross this gulf unless he "be born again"—born of the professional spirit.

But this does not necessarily mean that the true-spirited professional man should not, and does not, receive a liberal reward for his services. As a matter of fact, the services of such men are eagerly sought after by the class of people who are both able and willing to pay liberally for their services.

Nor does it mean that the dental or medical practitioner should in any way neglect the business side of his practice. On the contrary, the conscientious and successful dentist will have his office routine so organized that the business and other details will be properly looked after by others, leaving him free to devote his whole time and energy to the care of his patients.

The great need in dental practice today is not that we should develop a keener business mentality, or to aim generally at a higher standard of fees (though the latter may be true in many instances), but rather that the profession should sternly set its face against the threatened inroads of the mercenary spirit in the ranks of our profession.

Let any member of the dental profession (whoever and wherever he may be) render efficient and acceptable service, and the matter of fees will be at his own disposal.

The future safety and progress of the dental profession is not a matter of large or small fees, but in the last analysis depends on how completely the professional spirit in our ranks will dominate and keep under control the mercenary spirit.—R. G. McL.

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## Post-Mortem and Decent Burial Requested

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**D**R. T. E. C. BUTLER, of Toronto, was recently surprised to receive the following bit of clever nonsense, accompanied by an extracted molar, from an old patient who had been down in the Maritime Provinces on a business trip:—

"Dear Doctor:—Hope you will not fail to recognize the enclosed old acquaintance of some twenty years' digging and filling. He returns to you thus, in the hope that after the desired professional post-mortem you will grant him the favour of a decent burial. He parted company with the friend to whom he had for many years been strongly attached by ties of flesh and blood, at Moncton, N.B., in the year of grace, 1922.—R.I.P."

# ORAL HEALTH

A JOURNAL THAT STANDS FOR THE "OUNCE OF PREVENTION," AS WELL AS THE "POUND OF CURE"

VOL. 13

TORONTO, MARCH, 1923

No. 3

## The Choice of a Suitable Appliance for the Semi-Edentulous Patient \*

W. E. CUMMER, D.D.S., TORONTO,  
ROYAL COLLEGE OF DENTAL SURGEONS OF ONTARIO.

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- 34 R. The Anterior Four Teeth.
- 34 S. Indications for Temporary Full Dentures.
- 34 T. Indications for Permanent Full Dentures.
- 34 U. The use of the foregoing (and following) Formulae.
- 34 V. Practical suggestions in making choice.

## 34 A. THE CHOICE OF A SUITABLE APPLIANCE FOR THE SEMI-EDENTULOUS PATIENT.\*

THE choice of one or other of the appliances most suitable for the semi-edentulous mouth (which appliances range from no appliance to Full Denture) should be made as soon as a definite mental or graphic picture, or an actual view of the semi edentulous mouth, entirely free from disease, may be secured.

[\*To be inserted following Sec. 34, as 34A, in "An Outline of the Theory and Practice of Partial Denture Service, as appearing in Bulletin No. 5 Canadian Dental Research Foundation. Oral Health, Sept.-Oct., 1922. Journal American Dental Association, Sept., 1922. Dental Summary, December, 1922. Hya Yaka, January, 1923. The writer wishes to acknowledge the valuable assistance of members of the staff, R.C.D.S.]

## 34 B. CONSERVATION AS A BASIS IN CHOICE OF APPLIANCE.

Conservation, as hereinafter considered, consists in: -

- (a) *Avoiding CUTTING of natural teeth* with possible pulp involvement in other sequelae.
- (b) *Avoiding REMOVAL of natural teeth* so far as is practical, i.e., within biological, physical, and economic limits.

As a basic principle, and within biological and physical limits, conservation of remaining teeth in Prosthetic Dentistry is desirable because patients are permitted, so far as possible, to retain for their use their own teeth and associate tissues.

These teeth are, within prescribed limits, useful as assisting in the retention and the support of the dentures, and in the approximate proportion to the presence of natural teeth in favorable condition and position is the amount of pressure which may be exerted in mastication. Also, as a rule, the smaller the loss of natural teeth, the simpler, more effective and more acceptable to the remaining tissues, as well as less bulky, may be the restoration.

The most important reason, however, lies within the fact that our knowledge of human teeth, and of the human body, and of all creatures which live, will probably be always sadly incomplete because all of these things are but one evidence of the infinite knowledge, skill and love of our Creator. This evidence we are sometimes pleased to call Nature. A proof is that our explanatory hypotheses of Nature in the human mouth vary so frequently. How then, with our purely finite and incomplete knowledge, and our purely human skill, and a few comparatively crude materials, can we hope, even at best, to adequately replace human teeth, whether in part or entirety? In other words, how closely does the macroscopic and microscopic structure and function of a restoration actually approach that of the natural teeth and tissues?

A reasonable hypothesis is, therefore, that the retention of natural teeth is desirable, with biological, psychological, physical, and economic limits, examples of which are hereinafter mentioned.

## 34 C. THE STATUS OF CONSERVATION OF REMAINING TEETH.

At any period of dental history, past, present, or future, and within these biological limits, which we cannot as yet define, the number of remaining teeth conservable for use in denture work depends largely on the contemporary status of two phases of common knowledge and skill possessed by the dental profession.

These are:—

- (a) The status of Prevention, Diagnosis, Treatment and Cure of Dental Diseases, chiefly a *Biological* problem.

- (b) The status of Partial Prosthesis, and the comparative status of Full Prosthesis, chiefly an *Engineering* problem.

#### 34 D. PRESENT DAY STATUS OF PREVENTION, DIAGNOSIS, TREATMENT AND CURE OF DENTAL DISEASE.

While we may reflect with pride upon the progress which has been made in the past along these lines, both in learning and unlearning, even the optimist must admit that there is yet much to be done. And it may readily be seen that the amount of common knowledge which will be gained by the dental profession in the successful cure of disease will always be more or less proportional to the amount of conservation possible, and inversely proportional to the amount of elimination necessary.

#### 34 E. PRESENT DAY STATUS OF CROWN AND BRIDGE WORK, AND PARTIAL DENTURE WORK.

Crown and Bridge work which deals with spaces of two teeth or less has been lifted to a comparatively high state, but unfortunately the demands made by this work on both patient and dentist are as yet high. For fidelity to natural form, efficiency, hygiene and appearance, these more modern types approach, so far as our present vision sees it, as closely as may be expected to the natural teeth and parts.

Unhappily, however, and for reasons somewhat difficult to discover, comparatively little progress has been made in Partial Denture work since Bonwill's time. And more unhappily still is the comparative lack of both research work and workers on the unsolved problems of Partial Denture Work. It is, however, possible that the actual progress made has suffered in comparison to the apparent magnitude of the problem.

Partial Denture Work, which is a conservative branch of Prosthetic Dentistry, borders upon the non-conservation branch of Full Denture Work, and in consequence is most intimately bound up in the problem of Conservation.

#### 34 F. PRESENT DAY STATUS OF FULL DENTURE WORK.

Since the first visit of Professor Alfred Gysi to America, in 1913, history has been made in Full Plate work. Both prior to and following this great impetus, many research workers have appeared in the field. Finally these and other forces were organized into an active research unit, the National Association of Dental Prosthetists, in 1918, which has, and will, accomplish much.

The net result of this and other concentrated and enthusiastic effort has been that Full Denture work now approaches fairly close to the position of an exact science. The process has been the study

of a vast amount of technical and scientific detail, which has been so reduced and simplified that good Full Dentures are now possible for the patient of the average general practitioner.

#### 34 G. PRESENT DAY DISPROPORTION IN PROGRESS OF PARTIAL AND FULL DENTURE WORK AND ITS RESULTS TO THE SEMI-EDENTULOUS PUBLIC.

This unequal ratio of progress in these adjacent branches (the conservation Partial Denture Branch and the non-conservation Full Denture Branch) has had one unhappy but inevitable result. Full Dentures are often chosen for patients instead of Partials, because of the increased common knowledge and facilities for the acquisition of increased skill in Full Denture Work.

As common knowledge and skill in Partial Denture work grows, the present unequal balance will right itself, and a larger number of natural teeth will be saved to the semi-edentulous public.

#### 34 H. CHOICE OF APPLIANCE, AND DESIGN OF PARTIALS, ARE BOTH AS YET HYPOTHETICAL FORMULAE.

Scientific truth begins with the examination of a large number of facts, from which in the mind of the inquirer a hypothesis is born. This hypothesis may be explanatory of these facts, or may be a formula which removes the necessity for mental drudgery by reducing to a simple form directions which cover a large field of operations.

Repeated proof or otherwise of such hypothesis or hypothetical formula will in time either establish it as scientific truth or will disprove it. Black's original hypothesis of Extension and Prevention, now generally accepted, is an example of this development.

The formulae for choice of appliance and design as submitted are as yet more or less hypothetical, inasmuch as all of the known combinations (2<sup>16</sup>) have not as yet been applied to them. So long as this proof and that of years of practical use is lacking, exceptions may occur.

#### 34 I. PRELIMINARIES OF FINAL CHOICE OF APPLIANCE.

This hypothetical formula which follows presupposes:—

- (a) Remaining teeth and tissues to be in reasonable state of health, and likely to last.
- (b) Sufficient knowledge and skill of dentist to properly Design, Construct, Instal and Maintain various types of restoration below, with necessary co-operation of patient.
- (c) Intimate knowledge of tissues which will be given additional duty of retention and support, i.e., Periodontia or Mucosa.
- (d) Immediate restoration, preventing drifting, exfoliation, etc.

### 34 J. TYPES OF RESTORATIONS AVAILABLE.

The types of restoration at present available for the semi-edentulous mouth are as follows:—

- (a) *Requiring cutting of natural teeth*, with or without previous loss of tooth tissue from disease:—
  - 1. Crowns.
  - 2. Fixed Bridge.
  - 3. Partial Dentures with Compound Retainers.
- (b) *Requiring no cutting of natural teeth*:—
  - 4. Removable bridges using clasps or similar.
  - 5. Partial Dentures with simple retainers.
- (c) *Requiring ultimate removal of remaining natural teeth*:—
  - 6. Temporary Partial Dentures.
  - 7. Temporary Full Dentures.
  - 8. Full Dentures.

### 34 K. INDICATIONS FOR CROWN WORK.

- (a) Spaces with one recoverable root in favorable position and condition.
- (b) Spaces with two or more recoverable adjacent roots in favorable position and condition.
- (c) Teeth with crowns beyond recovery by operative means.

*Except*

- (d) That the combined mesio-distal length of such spaces between contacts exceeds  $1\frac{1}{2}$  the mesio-distal diameter of the original crown or crowns of each root or roots.
- (e) That there be insufficient tissue for operative restoration. (Operative work usually preferred if indicated.)

### 34 L. INDICATIONS FOR FIXED BRIDGE WORK.

Spaces simple or compound, each of which are equivalent of one, two, or occasionally three teeth having at either ends of the space any of the following, in which Modern Bridge Preparations may be made with safety to the Pulp:—

- (a) Pulpless teeth, or teeth with pulps well protected with dentine.
- (b) Extensively carious, eroded, filled or inlaid teeth.
- (c) Teeth with any marked predisposition to caries, or diseases of the enamel.

- (d) Teeth with enamel which may possibly disintegrate under a clasp or similar.

*Except*

- (e) That of hygienic maintenance by patient, improbable or difficult.
- (f) That abutment teeth be not capable of retention and support by known methods of Fixed Bridge work.

#### 34 M. INDICATIONS FOR REMOVABLE INTERLOCKING BRIDGE WORK.

Same as (34 L), except hygienic maintenance is not, or with difficulty, possible, and without probability of patient swallowing piece (this fine work is unfortunately not available to all patients, because of the high cost of production).

#### 34 N. INDICATIONS FOR REMOVABLE BRIDGE WORK USING CLASPS OR THEIR EQUIVALENT.

Spaces, simple or compound, each of which are equivalent of one, two, and occasionally three teeth having at both ends of the space teeth with suitable opposed convex surfaces, suitable for firm grip of clasp.

- (a) With unbroken enamel.
- (b) With small fillings, inlays or similar out of range of clasps or their equivalent.
- (c) With Crowns suitable for Clasps.

*Except*

- (d) Danger of patient swallowing piece.
- (e) Predisposition to caries.
- (f) Probability of disintegration of enamel under clasps.
- (g) Probable neglect or lack of appreciation of patient.

#### 34 O. INDICATIONS FOR PARTIAL DENTURES.

Combinations of sufficiently healthy teeth and spaces having teeth at either one or both ends of single or multiple space. These teeth are to be capable of retention of the proposed denture without over-function, or other Trauma, according to known methods of Design. The spaces are to be the equivalent of occasionally two teeth, usually three teeth and upwards. The fulcrum line must be in the centre of the restoration, in Classes 1 and 2, and the fulcrum triangle must approximately superimpose the outline of the restoration in Class 4.

*Indications for Upper Partial Dentures, two teeth standing.*

1. Any two of the posterior twelve teeth diagonally opposite, CLASS 1.

2. Any two of the posterior twelve teeth diametrically opposite, CLASS 2.

(Total combinations of two 120, of which above is but a fraction.)

*Indication for Upper Partial Denture, three teeth standing.*

1. Any two of the three remaining posterior twelve teeth diagonally opposite, CLASS 1.
2. Any two of the three remaining posterior twelve teeth diametrically opposite, CLASS 2.
3. Any three remaining posterior twelve teeth which include the cuspid and second molar on one side only (occasional), CLASS 3.
4. Any two of the remaining Posterior teeth with any one anterior remaining tooth in a triangular relationship, CLASS 4.

(Total combinations of threes 560, of which above is a fraction.)

*Indications for Upper Partial Denture, Four Teeth standing.*

1. Any two of the four remaining posterior twelve teeth diagonally opposite, CLASS 1.
2. Any two of the four remaining posterior twelve teeth diametrically opposite, CLASS 2.
3. Any four of posterior teeth on one side only, CLASS 3.
4. Any three of the four remaining posterior twelve in a triangular relation, CLASS 3.
5. Any two of the remaining posterior twelve teeth with any one anterior in a triangular relation, CLASS 4.

(Total combinations of fours 1820, of which the above is a fraction.)

*Indications for Upper Partial Five to Thirteen Teeth standing.*

(Upwards of 13 teeth standing, Crown and Bridge or no treatment usually indicated.)

1. Any two of the remaining posterior twelve teeth diagonally opposite, CLASS 1.
2. Any two of the remaining posterior twelve teeth diametrically opposite, CLASS 2.
3. Any five and up to eight posterior teeth standing on one side, CLASS 3.
4. Any three of the remaining posterior teeth in a triangular relationship, CLASS 4.
5. Any two of the remaining posterior twelve teeth with any one of the remaining anterior teeth, in a triangular relationship, CLASS 4.

## PARTIAL LOWER DENTURES.

*Indication for Partial Lower Denture any one tooth and upwards standing.*

1. Any one tooth and upwards standing unless exceptional facilities for the use of Full Lower Denture.

*Except*

- (a) Such combinations as are indicated for Crown and Bridge Work, see preceding.

## 34 P. GENERAL INDICATIONS FOR TEMPORARY PARTIAL DENTURES.

- (a) *Definition*—A temporary Partial Denture is one which is worn with the understanding that within an estimated time, understood by the patient, the remaining uninfected and non-irritating teeth will be lost and a more extensive Partial or Full Denture will become necessary.

(b) *These Dentures should be, if possible,*

1. Retained by most healthy remaining teeth and with vulcanite saddles, which allow teeth to be added as lost without changing denture. Frequently the denture will serve as a temporary Full Denture.
2. Provided with additional clasps to support such loose teeth as may be present and non-infected.

(c) *Temporary, as well as Permanent Partial Dentures are indicated for the assistance of the following persons who may have various difficulties with Full Dentures.*

1. Patients unaccustomed to Dentures of any kind.
2. Elderly, neurotic, or debilitated persons.
3. Special vocations requiring positive retention for teeth, as singers, clergy, teachers, wind instrument players, etc.
4. Idiosyncrasy:—Aversion to Full Dentures.
5. Upper and Lower mouths uncertain, difficult, or impossible for Full Plate retention from surgery, gunshot wound or other trauma, disease, or natural causes.
6. Patients who express a decided preference for this service.
7. Patients without whole or part of soft or hard palate.
8. Patients with uncontrollable tendency to "gag."
9. Patients for whom the shock of extraction is not desirable.

10. Cross-bite cases extreme types.
11. Other special reasons not mentioned here.

(d) *Temporary as well as permanent Partial Dentures are contra-indicated in the following:*

1. Special vocations as Bakers, Candy Makers, etc., with uncontrollable predisposition, or other causes resulting more or less in uncontrollable dental diseases.
2. Persons who wish a minimum expense.
3. Persons of confined bad habits of Oral Hygiene.
4. Persons careless and low in intelligence and appreciation of service.
5. Persons whose occupation prevents possibility of aid from dentist between long periods.
6. Cases with uneven distribution of root and mucosa support, upper and lower jaw—and without facilities for professional oversight with such rebasing and similar as may be necessary.
7. Other special cases not mentioned here.

(e) *Upper Temporary Partial Dentures.*

These may be used with any combination of non-infected and non-irritating teeth capable of temporarily retaining or assisting in the retention. The fulcrum line must occur in the centre of the restoration, and the fulcrum triangle over the centre of the restoration, with at least:—

1. Any two posterior twelve teeth diagonally opposite, CLASS 1.
2. Any two posterior twelve teeth diametrically opposite, CLASS 2.
3. Any two (rarely three or more) posterior six teeth on either right or left side only, CLASS 3.
4. Any three or four teeth in a semi-triangular or quadrilateral relationship, CLASS 4.

(f) *Lower Temporary Partial Dentures.*

May be used with any combination from one and upwards remaining non-infected and non-irritating teeth, capable of retaining or assisting in retention in any way.

### 34 Q. COMBINATION CASES.

Frequently a set of oral conditions may present, which in one portion of the mouth, for example, a fixed bridge is decidedly indicated—and in an adjacent portion a partial Denture is indicated. Com-

binations occur with indications for both crowns and fixed bridges—fixed bridges and partial dentures—and partial dentures and crowns—in the same mouth.

It is frequently advisable to fit both of these fixtures to the mouth rather than a single, for example, partial denture. If any doubt exists as to the superior restoration, sketches should be made of each alternative, and studied in comparison, the one with the other, before a choice is made.

#### 34 R. THE ANTERIOR FOUR TEETH.

Isolated upper or lower incisors, singly or in groups, which stand in combination with other groups of teeth which furnish retention, frequently present difficulties in construction, and in the subsequent hygiene and esthetics of the piece. In these cases, whether for temporary or permanent partial denture work, their removal is more often than not advisable.

Note:—Any of the remainder of the sixteen combinations of the upper anterior four teeth standing alone are also rarely useful except in temporary partials. These may be retained, however, for esthetic, sentimental or other reasons. Patient should be asked to accept responsibility.

#### 34 S. INDICATIONS FOR TEMPORARY FULL DENTURES.

##### *Temporary Full Upper Denture.*

1. Upper edentulous mouth.
2. One tooth standing—removal in practically all cases.
3. Two to four teeth—removal except as indicated for  
Partials.
4. Any of 16 combinations of anterior upper four teeth remaining indicate removal and Construction of Full Denture, (except for special reasons, personal or otherwise, and patient accepts responsibility).

##### *Temporary Full Lower Denture.*

The edentulous mouth.

#### 34 T. INDICATIONS FOR PERMANENT FULL DENTURES.

1. The Upper edentulous mouth with absorption complete.
2. The Lower edentulous mouth with absorption complete.

#### 34 U. THE USE OF THE FOREGOING AND FOLLOWING FORMULAE.

Prosthetic Dentistry is an engineering problem, but modified by biological and psychological considerations unseparable from the

living tissues upon which these engineering structures are built.

Engineers who design and build buildings, highway and railroad bridges, steamships, and other structures make free use of formulae into which months, perhaps years of experiments result, calculations and other data are packed. The formulae must be frequently modified to suit special conditions according to the judgment of the engineer.

The dentist who uses the foregoing and following formulae, must understand that these are presented as applying to the average or normal condition. By study, observation and experiment these can be condensed and set down on paper as a working formula. But special biological, pathological, physical, psychological, economic, and other conditions are so varied that they cannot be set down on paper. Hence for the sake of expediency, problems in which formulae are used, such as the choice or design of a denture, might best be worked out as normal, and subsequently modified by the special consideration mentioned above.

This is probably the most important part of the problem and depends entirely upon the judgment and experience of the dentist.

#### 34 V. PRACTICAL SUGGESTIONS IN MAKING CHOICE.

1. If in doubt between two restorations develop both designs on paper, picture these in your own mouth.
2. This having been done, and merits of each, in your knowledge and experience, appear equal, discuss first, if convenient, with a fellow-practitioner, then with patient.
3. Do not advise patient of choice until having fully made up your mind.
4. It is advisable to casually learn the patient's wish. If patient insists against your judgment the responsibility should be accepted by the patient.
5. If any doubt exists as to the ultimate success of a Partial Denture, the responsibility for which the patient is, for any reason unable to accept, a Full Denture is advisable.

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## Dominion Dental Council and Five-Year Course

**S**TUDENTS entering upon the study of Dentistry after August 30th, 1922, will be required to submit satisfactory proof of being a *bona fide* student of Dentistry in a recognized Canadian Dental School that requires a Five-Year Course.

# Red Cross Dental Service in Manitoba

R. H. MURDOCH,

ROYAL COLLEGE OF DENTAL SURGEONS OF ONTARIO

THE Junior Red Cross Advisory Committee of the Province of Manitoba, early in the year 1922, determined to render some dental service to the children residing in the rural districts of the province. It was not the intention of the Red Cross to render free service to all the children in the various localities, as this would have been an impossibility, or to try and render all the service actually needed by the children of school age, but rather to try and show the people of the whole province something of the need in the outlying districts; also as an educational factor to help the children try and save their teeth and point out to the parents the need of regular dental inspection, with its value to the community. By first using the most outlying branches as a starting point, then working farther in towards the settlements, it gave us a chance to bring in more of the educational work and take only those cases who were unable to go to a private dentist. You are now no doubt able to see that our object was two-fold—first, to give service to the community, with the added educational feature; secondly, to help the dental profession indirectly by showing the public the need of dental service.

The field selected as being the most needy was that stretch of country lying between Lake Manitoba and Lake Winnipeg. In this area are situated about three physicians and two dentists. The people are nearly all new Canadians, having come from Europe just previous to the war. Many nationalities are represented, but those predominating are Slavs and Icelanders, while in the outskirts are found our worthy returned soldiers on their new homesteads. Among the last-mentioned we carried on the greater part of our work. Many of these homes are situated about one hundred and thirty miles north of Winnipeg.

To give you a clearer idea of the difficulties of our work, I wish to present a brief description of this locality. The country is low and flat, with not a hill to be found. Here and there are large tamarac swamps, with jack pine ridges running between; some places you will find timber suitable for lumber, but most of it is small spruce, intermingled with poplar patches. A great deal of the country has in recent years been burned over, so that it is in these partially cleared patches, with their hundred loads of stone to the acre, that we found our soldier settlers trying to make a living as best they could. With such conditions clearing is a slow process, and the men are forced to go out and work in the winter, sometimes in the summer, too, while the women and children hold down the homestead. In the new Canadian districts they seemed to have a

little more cleared; but here, too, is found a great deal of the hardship of pioneer life. Kindly allow me to repeat an extract from my diary, showing you the difficulties encountered in travel: Davis Point, Man., May 13th, 1922. Arriving at a railway siding (as in this part of the country station houses are a luxury), I stopped at the store overnight, the mail man refusing to drive out that night, as the roads were in too bad a condition for travel after dark. The school I was heading for was nine miles from the siding, and I expected to reach it in a couple of hours the next morning. But although we left at 8 a.m., in a light rain, it was 1 p.m. before we arrived. On one occasion we were stuck in a mudhole, where my driver was forced to go over his waist in water to get his team out, while I, perched on the top of my equipment, managed with a good jump to land high and dry on a log. During the whole trip not over two miles were on dry land, while the rest was in water nearly to the axles. A car would not work very well in this country!" However, as time went on, we worked nearer to civilization.

When you are about to start into a district where roads are unknown and trails which can be travelled with oxen hard to find, it is rather a difficult task to select a proper dental equipment. It must be so compact as to be carried in the back of a democrat or buckboard. I admit it seemed almost impossible to select suitable equipment, yet I had to do as best I could. Here is a list of the articles:

I used my regular college instrument case to carry my plastic, cutting instruments, dressing, pliers, etc.

My engine was an all-cord S.S. White foot engine, for which we had a specially built case. Then I had a trunk made so that it would fit nicely into any democrat or light vehicle. In the trunk I carried my instrument case, a gasoline blow-pipe (Ransom and Randolph), with foot bellows; a Premier gasoline stove; a Roach casting machine, so fixed that I could clamp it on to any table. For a lathe I had a head that fitted on my engine upright, using the regular base to run it. For a sterilizer I used a double boiler on my gasoline stove. The chair was one of the old dental chairs used in France; all my small bottles with drugs were carried in the cuspidor, so that if they should chance to spill they would not run over everything. My laundry was taken out in a regular Red Cross bag, and sent back to the city once a week. There were sixty towels and four gowns in the bag, which was my week's supply. This made it necessary to use three laundry bags of the same contents, so that I had one, one was in the city being cleaned, and one on the way. Every available space, such as around the chair and in the engine case, was filled with small articles such as tooth brushes, paste, charts, etc. When all was packed I had in all five pieces, namely: 1, Chair; 2, engine in case; 3, trunk; 4, laundry bag; 5, my own

personal suit case. I would take about an hour and a half to pack up, and the same to unpack; this I did once a week on the average, although I have moved twice a week as occasion demanded. All cases were light enough for me to handle alone, and all were nearly weather proof.

My work was largely confined to an effort to try and save the permanent teeth of the school children; but my instructions were that no person suffering pain was to be turned down, and that money was not to be considered. A charge of 25c for extraction, 50c for fillings and 50c for prophylaxis was made to school children, while with adults regular charges were made. However, collections were difficult. Some days you would not collect fifty cents, while the next you might get ten to twenty dollars. Our idea was not to pauperize the people, but try and educate them to what dental service was really worth, and collect what we could. You may ask why I treated adults at all. But when you consider that a great deal of the time I was fifty to sixty miles from a physician and a hundred from a dentist, you can readily see you had to do as you could, not what you would like to do. For the children in the schools I did what I thought best, and when it came to permanent restorations, used gold foil, inlays, silver amalgam and silicates. Root canal treatment I did not attempt. For deciduous teeth we used copper cements, oxyphosphate, copper amalgam, and base plate gutta percha, depending on the condition. My method was to do what I did well and let the rest go, as it was impossible to do all the work required. All money collected was turned in to the Red Cross.

On entering a school I first gave the children a talk on their teeth, getting a general idea of how often they cleaned them and how they cared for their own mouths; then a talk on how they should care for their teeth, and why, using charts and illustrations; demonstrated the correct method of using the tooth brush; gave each child a tooth brush and tube of paste (Hutax paste and Hutax medium brush); when possible had the children use their brushes before me, to make sure they knew how. After the talk and demonstrations the mouth of each child was examined and charts were made out. The charts were sent home with a parent's consent form attached, or, if we had not enough charts, just a note on the parent's consent form was used, giving the parent some idea of what should be done. If the parents wished to have any work done they signed the form and sent the child to our clinic with the fees, if they had the money. At the close of my visit suitable literature was left with the children to interest them in the further care of their teeth and health. In the pictures with this article you will see a group of children (Icelandic) sitting outside the Junior Red Cross clinic. A pond is nearby, where numerous mosquitoes kept us all interested. The waiting-room inside

is filled. This will give you some idea of the numbers waiting.

In rendering our service you can readily see that if every student in the R.C.D.S. of to-day were engaged in this service, Manitoba and Ontario alone would not be served. One week alone I turned away three hundred children, and twenty or thirty was not a common number to pass over at many of the schools. Many difficulties were encountered in transportation and in equipment, but they are all now at least partially solved. People readily see the need for the service, as numerous letters sent in by the different school districts will testify. Everywhere we had the support of the districts visited, the only fault seemed to be that our visits were too brief. Accommodation was solved by the use of farmhouses, parts of school houses, or rooms above country stores, etc. Anything or any place as long as it was clean and not too much rain coming in!

From the financial side it was not so very costly. The total cost of the service to the Red Cross, from early in April to the sixth of September was sixteen hundred dollars. Four hundred dollars was collected in fees. The arrangement with me was that I should supply the instruments, while the Red Cross supplied the material. The Manitoba Dental Board supplied the chair. I received a salary of one hundred dollars a month and all expenses.

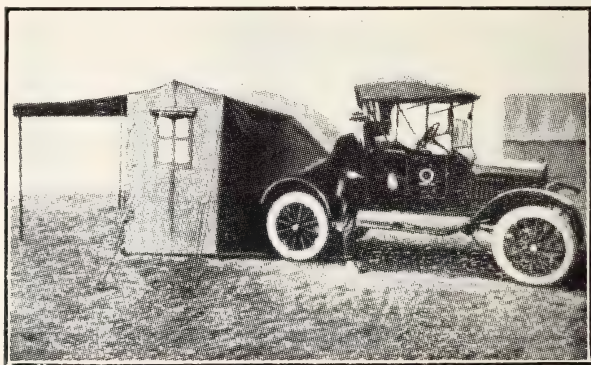
The service is only started. What must it be like when we come to the districts nearer the settlements, especially when you remember that the children in backwoods are comparatively immune from caries compared with those in the vicinity of a store? In schools in the backwoods we would find as high as six free from caries, while in a school near a village or store, with an enrolment up to fifty, we were fortunate to find one free from caries. This goes to prove that dietic conditions have a good deal to do with caries. One of the largest things in dentistry to-day is the Junior Red Cross Dental Service. The Red Cross Society is world-wide, and they have the organization to carry on this great educational campaign. Because of their unity and system they can do it more economically and more efficiently than anyone else. It is not the intention of the Red Cross to make this work permanent, but to show the people the need, so that various municipalities and towns, which up to the present have not started or thought of school dental clinics, will have them started. As soon as that is done, then the Red Cross will at once withdraw. What does all this mean? Health to the various communities, positions and demand for dental services such as has never been heard of before. No doubt it will be years before the smaller towns and municipalities will have their own clinics. But the school clinics in all districts are bound to come, if only the Dental Profession and the Red Cross work together.

In conclusion, I wish to thank the Manitoba Dental and Red Cross boards for all their help last summer, and also the many friends who have been so kind as to help me with this report.

## Children Help Themselves in Saskatchewan

*[This article outlining the Dental activities of the Red Cross in Saskatchewan, along with that by Mr. Murdoch, appearing upon another page and covering Red Cross work in Manitoba, will give the profession some conception of what the Red Cross is doing for the "kiddies" in these western Provinces. The Red Cross will find the Dental Profession throughout Canada ready to co-operate in every way possible.—Editor].*

**I**N the late Fall of 1921, the Saskatchewan Junior Red Cross inaugurated a dental service for children attending rural schools, or at points where there is no resident dentist, and for this purpose purchased and equipped two motor cars, placed them in charge



of fully qualified dentists and assigned one to the northern half of the Province and the other to the southern portion.

This action of the Saskatchewan Junior Red Cross was begun as a result of the facts disclosed by the reports of the School Hygiene staff of nurses employed by the Department of Education.

The examination of 15,000 children in 548 schools in 1919 showed that no less than 8,705, or 58 per cent. were handicapped by decaying teeth. In 1920 it was found that out of 33,821 children examined in 1,121 schools, 20,576, or a little over 60 per cent. had decaying teeth.

The nurses, in carrying out their duties, reported to the parents that their children required dental treatment. Owing to the generally prohibitive expense of taking these children, frequently from isolated rural districts, to a point where the service of a dentist could be obtained, these children's teeth remained in a neglected condition, and threatened to undermine their general health and lead to disease. For example, of the 20,576 reported in 1921, fewer than 3,000 were reported as subsequently receiving treatment.

In carrying out its peace-time policy for "the promotion of health and prevention of disease," the Red Cross decided to inaugurate this dental service for children by means of motor cars which would go direct to the schools after the visit of a nurse.

In addition to providing dental treatment, tooth-brushes and tooth paste were supplied to children who needed them. At each school the children were given by the dentist a simple talk on Oral Mouth Hygiene and the proper way to use a tooth brush.

The following is a brief statistical record of the work accomplished during the first year of this service, (1922) a service which has called forth strong commendation from school nurses, teachers, and school district officials, as well as from parents generally:

Number of motor cars employed .....	2
Number of School Districts visited .....	284
Mileage covered by cars .....	15,767
Number of children treated .....	3,877
Number of operations performed, i.e., Fillings, Extractions, Cleaning teeth, etc. ....	7,438
Tooth brushes and tooth paste distributed .....	1,200
Revenue received from nominal fees charged (Fillings 50c.; Extractions 25c.; Cleaning 50c.) .....	\$1,690.00
Free service given on basis same charges .....	1,305.50
Addresses given on oral hygiene .....	284
Pupils present at addresses .....	8,250

## Alumni Society of the Dewey School of Orthodontia

THE next annual meeting of this society will be held on April 12th-13th, at the Edgewater Beach Hotel, in Chicago. The usual high standard of the meetings of this society will be maintained. All interested in Orthodontia are cordially invited to attend these meetings.

GEORGE F. BURKE, Secretary,  
741-43 David Whitney Bldg.  
Detroit, Michigan.

## Dates of Dominion Dental Council Examinations

THE Dominion Dental Council Examinations, 1923, will be held in the agreeing provinces throughout Canada during the summer and in the fall, commencing on Tuesday, 29th May, 1923, and again on Tuesday, 18th September, 1923.

# Some Physiologic Principles in Orthodontia\*

BY MARTIN H. FISCHER, M.D., CINCINNATI, OHIO.

I DO not know why I was honored with an invitation to speak to you to-day unless it is the consequence of an address<sup>†</sup> given many years ago to my medical and dental colleagues in Cincinnati. In it I talked of some matters concerning the teeth from a physiologist's point of view which to me seemed self-evident. In this I was mistaken, for my remarks gave occasion to debate. Since that time many of the things which we regarded as differences in opinion so fundamental that they could never be reconciled, we have been able to smooth out, so that to-day we may safely say, I believe, that thinking dental and thinking medical men agree as to what can and what cannot be done in the mouth.

I think it hardly necessary to commend your special field. I say to my students that, if they do not know that the teeth and their proper use are of the greatest importance, to consider the bulldog, because of all the canine pets, the life span of this individual is the shortest. This is because orthodontia is not a popular form of surgical practice as applied to the bulldog. Moreover, the orthodontic surgeon is the master of a field as broad as that of many another surgical specialist. He operates upon structures as numerous as those which concern nose and throat surgeons or orthopedists and he is called upon to know and use every principle of general surgery which applies in the correction of deformity, in the maintenance of physiologic function and in the combating of infection.

1. I suppose that a medical man has been asked to address you this afternoon because at various times medical men and orthodontists have crossed scientific swords. Our professions have often enough dragged at a patient in opposite directions—the one of us to save his physiognomy and his oral physiology, for example, the other his kidney and an excretory function. But such differences in opinion cannot endure between reasonable men; they need only to come to a common understanding of what are the scientific principles which are involved, and then they will agree.

It must be understood from the outset that the medical man has no quarrel with the fundamental aims of the orthodontist. He is just as interested in the proper placing of badly erupted teeth and in the correction of malformed jaws as is the orthodontist. What differ-

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\*Stenographic report of an address to the American Society of Orthodontists in Chicago, April 25, 1922.

†Address before the Cincinnati Dental Society, January 29, 1915, and first published in the Dental Summary, xxxv, 607 (1915) and since then with various additions in *Lancet-Clinic*, cxiv, 124 (1715); *Oedema and Nephritis*, 3rd Edition, 815 (New York, 1921) and as a monograph: "Infektionen der Mundhöhle und Allgemeinerkrankungen," translated into German by I. M. Handovsky (Dresden, 1921), and *The International Journal of Orthodontia*.

ences of opinion therefore exist can only concern the means employed in the accomplishment of the common ideal. The medical man has reason to believe, for example, that serious systemic disease is aggravated or induced by the things which some orthodontists do and defend. When children nowadays develop certain types of systemic disease, such as nephritis, endocarditis, St. Vitus' dance, certain nerve lesions, etc., we are obligated, through the scientific advances of the last fifteen years, to discover how these diseases enter, and, at times, the only thing coincident with such infection has been the practice of certain orthodontic procedures. Then it is that we may hear a medical man say that the orthodontic work must be stopped, and certain corrective structures be removed, while an orthodontist takes an opposite point of view.

The relation between these serious constitutional diseases and their origin is no longer a matter of debate. It is carrying coals to Newcastle to discuss the question in Chicago where our ideas of this subject have been born and developed by the patient and glorious work of Billings, Rosenow, Davis, LeCount, Leila Jackson, Irons, Wood-yatt and Dick. What these men have written constitutes unquestionably the brilliant chapter of our modern medicine and its correct understanding has meant more for the relief of constitutional disease and suffering than anything else I know of in the medical world for a quarter century past. Their work has made certain the bacterial origin of diseases whose etiology was formerly mere mysticism. I will not weary you with a repetition of the obvious, but there is now no longer question of the bacterial origin of the various forms of endocarditis, myocarditis, and pericarditis; of the muscular rheumatisms, the joint rheumatisms and arthritis deformans; of the various forms of neuritis of central and peripheral origin. Infectious in origin are also gastric and duodenal ulcer, gall bladder disease with or without stone, appendicitis, many forms of acute and chronic kidney disease, certain diseases of the eye, like iritis, and various types of skin affection. For all these diseases organisms have been isolated from the affected human lesions and their inoculation into animals has reproduced the disease. Bacteriologically, the circle is therefore complete.

The bacteriological origin of other diseases is highly probable, though the proofs are not yet so binding. The whole story of arteriosclerosis with the chronic kidney disease of Bright probably belongs here and so that of metastatic pancreatitis with diabetes; various forms of organic nervous disease affecting both motor and sensory tracts belong in this class. There are the various isolated and group paralyses that we see, the tics and the many painful sensory nerve lesions. I have long held, on the basis of clinical observation and autopsy findings, to the infectious nature of many of the "insanities." I list these things because, as medical men, we

face these problems daily and, if intelligent, we must ask regarding their origin. Our attitude in these practical problems is not a matter of some one's hypothesis or a blind following of some man's hobby; it is a question of doing conscientiously that which scientifically, in our present light, looks nearest right.

With these things before us a new responsibility comes to rest upon us as practitioners. We have to discover in every such instance what are the possible sources of infection. Do not imagine that I always blame the teeth. The original foci of infection may lie in the tonsils or the accessory sinuses; they may lie in infested genitourinary tracts, in hemorrhoids or ingrowing toe nails; they may lie in infected gall bladders, appendices or blood vessels which, while originally infected secondarily, have now become primary foci which seed the blood stream. I repeat these facts because it is so necessary for the skilled specialist always to see the whole human being, and the number which can do this is none too large. I say these things because, when face to face with an afflicted patient, all such sources of infection must be found, and in order to emphasize that the happy verdict of a physician that he "finds nothing" also means nothing.

After these remarks you will understand why I shall turn frequently from a consideration of orthodontic procedures in particular to those of dental surgery in general and from these to general surgery and medicine. Orthodontic surgery has set for itself a certain goal, the good purpose of which no thinking man will debate. The questions at issue are only subsidiary ones. In the march toward the common goal are mistakes ever made which, while not apparent from a purely orthodontic point of view, are disastrous from a general surgical or medical one? I think that this is the case, and we need to consider them. Instead of the absolute ideal of the orthodontic surgeon is it not better for the patient to be content at times with a half portion; or must we not, when face to face with certain established pathologic conditions, take even less, if the general health is not to suffer?

I question whether the day will ever come when the majority of our patients will come to us because they should, not because they must. They come to us, in other words, not for prophylaxis but for the relief of established pathologic conditions. This means that the work of the orthodontist is handicapped from the start, and beset by definite difficulties. Rarely does the orthodontic patient present himself early enough, and rarely is the deformity of malocclusion the only problem in dental pathology to be met. The problem of distortion is all too frequently complicated from the start by infections in and about the teeth. It does not matter whether you hold caries to be an infectious disease *per se* or whether you believe it dependent upon nutritional disturbance upon which an infection becomes implanted. In either case the principles of surgery which have to be

invoked are not the simple ones of aseptic procedure but the heart-breaking ones of restorative surgery in an infected area. The problem is given us and we need to meet it.

2. I believe that in order to meet properly the orthodontic problem we need to bring the principles of physiology and pathology to bear upon it. What are the teeth anyway, and what is the nature of the pathologic problems which confront us? Some of my dental colleagues grow impatient when I say that it is well to talk of the teeth as bones (which they are, a little bit modified); that the peridental membrane is better recognized as periosteum; that a tooth in its socket lined with synovial membrane is the same thing as a knee joint, an elbow joint, or any other joint of the body. Such was the description which John Hunter gave the teeth in 1790 and it is still the best that has been given the profession. Since Hunter's day we have invoked much Greek and Latin, but as I say to my students, if it cannot be said in English, our knowledge of the subject is either vague or erroneous.

In the handling of the primary orthodontic problem—that of the proper placement of distorted and malpositioned teeth with its restoration of a more normal bite—the orthodontic surgeon deserves much credit because, almost alone among the surgeons of to-day, does he hold to principles of physiology as the basis for his work. Outside the field which gives his subject such popular standing—that of the building up of better facial contour, the medical value of which is quite secondary—the orthodontist strives to get teeth into proper place and alignment, and jaws contracted or expanded to the end that the function of the teeth and jaws may be properly carried on. To accomplish such result the teeth are pressed and pulled into proper position and through the bone absorption and bone deposition thus favored a better functioning of the teeth in their sockets is obtained to the end that a normal physiology may result. In these manipulations the orthodontists employ a physiologic principle which medical men and surgeons seem largely to have forgotten—namely that a normal physiology and a normal development follow only upon normal and continued use of an organ. If I may return to my bulldog for a moment, it is, of course, because of his malocclusion, his teeth unopposed and the liability of such nonworking bones and joints to atrophy and infection that his whole life expectancy is shortened and his days of systemic health are abbreviated. These constitute the reasons why orthodontic correctures when properly carried out yield such magnificent results. By getting the teeth in proper alignment and the jaws into proper relation to each other, previously unworked jaws are put into use; underpressures and overpressures between opposing teeth are restored to normal, the final result expressing itself in such a laying down of bone within the tooth itself and in the jaws as to give us the desired normal. The whole represents

the best possible utilization of orthopedic surgical practice, for deformities have been corrected, and functionless or badly functioning structures have been put back to normal use. A cripple has been put on his feet once more.

Let me digress a moment. Medicine and biology are obsessed these days by an anatomical way of looking at things. Living cells, tissues and organs are looked at as things possessed of a form which determines their function. It is exactly the other way about; and the orthodontists are among the few biological thinkers who know and utilize this principle. Form is the result of functional activity and the size and quality of performance of an organ is dependent upon the degree and the amount that it is used. This is the law of Lamarck enunciated more than a century ago but forgotten or despised by the modern biologists who cut too many sections and do no experiments.

Independently of the question of infection, to which we shall come presently, are there no dangers incident to the efforts of the orthodontist? There are, I think, and we need to consider them. As I said a moment ago, it must be kept in mind that the normal tooth is a living structure whose life is maintained through a proper blood supply, while the relationship of any tooth to the jaw is intimately associated with certain pressure effects which express themselves in bone absorptions and bone depositions in and about the tooth. When the orthodontist moves or turns a tooth he encounters two dangers. The first has to do with a possible strangulation of the afferent or efferent blood vessels bringing nutriment to the tooth; the other with the after-effects of the newly applied pressures between tooth and jaw. You utilize the principle daily that pressure leads to bone absorption in the direction in which the pressure is made. But in producing such pressure artificially you work between two extremes. Sufficient pressure must be applied to get absorption of bone in the direction in which it is wanted but this end must be obtained without danger to the blood supply of the tooth itself. Authorities in orthodontia state too often that there is no danger to be anticipated from the strangulation of the circulation to a tooth. There is to my mind great danger. Anatomical study or even casual x-ray examination of root tips will convince anyone how slight a movement in certain directions is necessary to lead to complete interference with their blood supply. The pain suffered by patients after a too rapid movement of the teeth is too commonly the symptom of a strangulated blood supply and the death of a tooth pulp. If the resulting edema of the tooth pulp is not relieved, its death follows and the death of the central portions of the dentine also. Surgically speaking, we have killed bone, and such dead bone, even when given the special name of tooth, constitutes a sequestrum in the terms of general surgery. Even without superimposed infection such a tooth is a misfortune. If

the strangulation has been brought about in a deciduous tooth, the eruption of its permanent successor is interfered with; if it has been brought about in a permanent tooth, there follows not only its discoloration but the half-dead tooth is brittle and its liability to secondary infection very great.

There are given here the possibilities for much reform in orthodontic practice. Bone absorptions and bone depositions occur more quickly and more effectively in young structures than in older ones. Orthodontic procedures should therefore be initiated early. In fact, it has seemed to me that corrections as carried out in older individuals nearly always fail. Individuals over twelve, and with increasing frequency as the years increase, rarely hold what has been won for them by the orthodontists. Even when gotten into better position, the necessary bone deposit needed to hold what has been gained is rarely obtained, and so in the course of a year or two the teeth slip back. In such older individuals the secondary dangers incident to orthodontic manipulation are also greatly increased. The number of strangulated pulps and consequent half-dead teeth is enormously increased, and, as I shall show you in a moment, because of the so common superimposed infections present from the start, the number of serious systemic effects also.

It has seemed to me, also, that orthodontists try to accomplish their ultimate corrections in too short periods and too often by the employment of pressures upon isolated teeth which cannot stand such. A slow correction not only reduces the dangers of tooth strangulation but allows for bone absorption followed by bone deposition without the hazard of bone necrosis invariably consequent upon excessive or too rapidly applied pressures. Why such bad effects are more apparent in the old than the young is the consequence of differences in the bone structures manipulated,—the springy, less ossified jaws of a child, for instance, being capable of withstanding pressure and movement effects which must invariably be disastrous to the harder structures of adults.

These remarks may explain also why an orthodontic correction which depends too exclusively upon a pressure applied to but one or two teeth is the dangerous thing it is for such teeth. Correctures which apply counter pressures to the jaws are always to be preferred to those which apply such to individual teeth, because the jaws can stand what a tooth movable in its socket cannot. Where teeth must be used it is best, obviously, to use several (as many as possible) as the base toward or from which a single other tooth is to be moved.

If what I have said is correct, it is obvious that the moving of the teeth in orthodontic practice needs to be accomplished so slowly that, while pressure effects are obtained, on the one hand, which will lead to bone absorption in the direction in which we desire it, it will never be so great as to lead to strangulation of the nutrient arteries to the

teeth themselves. The use of the word "great" is decidedly relative, but other things being equal, the turning of a tooth is more to be feared than monodirectional movement and the movement of a tooth through much of an arc more than the movement through a lesser one. It is for this reason that it has seemed better to me, at times, to sacrifice a portion of that principle in orthodontic practice which tries to restore every tooth and both jaws to that absolutely normal alignment characteristic of the second set of teeth. The great amount of movement of many teeth and the great expansion of the jaw demanded in heavily undershot or overshot deformities might better be met by a partial sacrifice of this absolute ideal with its lessened dangers of strangulated teeth. It is better to my mind to extract a couple of teeth and thus produce improved apposition between the remaining ones than to follow the more radical procedure with its coincident dangers.

3. The orthodontist recognizes that behind the ready-made deformity which he is asked to treat, there lie developmental difficulties through which false relationship has been established between the first set of teeth and the second. Just how this comes about is still imperfectly understood but the orthodontist knows that at least a part of the molding of the jaw\* and the proper placement of the second set of teeth is distinctly a matter of proper development, in the first place, of the first set of teeth followed by a proper development of the buds of the second set, succeeded by their proper eruption, and, finally, proper use. While we are unacquainted with the exact chemistry which underlies bone and tooth development we are familiar, particularly through the work of American investigators, with the food requirements without which animals cannot develop such structures properly. A far-seeing orthodontist will try therefore to assure his charges such a normal background. Since tooth buds are already laid down in the jaws of a new-born child, it is obvious that the orthodontist, like any intelligent physician, must start his care with the mother, seeing to it that she is furnished all necessary nutriment for the proper building up of these structures in utero. Proper nourishment must then be assured the new-born child and such a background must be maintained until the last tooth has erupted. There has to be furnished, in other words, almost from the conception of the child to its adult years the necessary material out of which to build the proper machinery; the machinery once properly constructed needs then to be kept in proper use.

The problem of prophylaxis, already well met by the dentists, needs further broadening. Mother and child need food, and plenty of it; but it needs to have not only a proper quantitative composition but a qualitative one as well. It is enough to look at the things fed

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\*That associated with the normal or abnormal development of the nose and accessory sinuses is here ignored.

people, beginning with the children, and to cast one's eye over the popular hospital trays, to be convinced that our dietaries call for absolutely no function on the part of the alimentary tract. If you want to know why the whole American race is constipated, it is largely because its alimentary tract is never given a job to do. Peristalsis needs not only a healthy intestinal musculature but an adequate stimulus to make it work. But how can the involuntary musculature of our alimentary tracts either develop or maintain its physiology if year in and year out it is fed pap? It is the same with the teeth. We lose our even well-developed dentures because we never use them any more.

The laws of nutrition for young and old are fundamentally simple. I teach my students that the golden rule of dietetics is to eat regularly of the things one likes and all he can. This is not a joke but a categorical statement of scientific truth. Such a rule leads any but the sick to choose an abundance of protein, carbohydrate and fat and in sufficient variety to give balance to cover properly from day to day the needs of the growing or mature organism. What is it, specifically, that we need to guarantee the children? They have to have first and foremost what the scratching chick looks for. Poultry breeders furnish "scratch feed" and maple flooring to their chicks, forgetting that the poor thing is looking for a worm. Scientifically, it is looking for raw protein, and that, too, is what the child needs. A second necessary element is raw animal fat,—not cottonseed oil or cocoanut oil or sterilized butter, but animal fat. Professors have not always known this, but the birdies have. A bird's Christmas tree is a success if it is plentifully hung with suet and bacon. Oleomargarine and cocoanut oil vendors will tell you that their substitute table fats are the chemical equivalents of fresh butter, fresh milk and fresh animal fats, but such substances lack, as you know, the necessary fat-soluble vitamins without which normal growth is impossible. Finally, we need articles of food which will prevent rickets, such as the juices of fruits and vegetables. It does not matter whether you follow the scientific theories of one group of students or another, whether you think there are two vitamins or three or a whole flock of them. The plain English of it all is that developing children and mature individuals need for growth and for proper maintenance of their mature organism, fresh food, non-sterilized food, and plenty of it.

Assured by such methods of a normal ground structure, the teeth, after their eruption need use. And how much of the substance of what we feed children or adults calls, to-day, for mastication? What little body is left to our denatured foods is done away with by the drinking of fluids with meals. The taking of water with meals is not bad, as so commonly taught, "because it dilutes the gastric juice." Much water improves such digestion, improves food absorption and decreases abnormal intestinal fermentation. The drinking of water,

to put it plainly, is not bad for the stomach but very bad for the teeth for it sets aside their possibilities for hard and continued use.

The popular cartoons and advertisements of to-day show you a child holding in its right hand white bread with oleomargarine spread on thick and in its left hand a bottle of root beer. If scientific knowledge entered our daily lives, the white bread would become whole wheat bread, the oleomargarine unsterilized butter, and milk or orange juice or tomato juice would appear in the child's left hand. Is it any wonder that after a few years of nothing but denatured wheat, oats and corn with soft drinks to wash them down, the teeth get tired and jump out of the jaw?

4. We come now to the third problem which confronts the orthodontist. Not only does his patient come to him too late for adequate prophylactic care, and not only is he in practice asked to correct an established maldevelopment, but he is usually asked to do this in the face of an established infection in or about the mouth. I need not go into details. The orthodontist has to meet not only pathologic conditions within the teeth themselves like caries with superimposed infections, too frequently gone to the extreme of having destroyed the life of a tooth, but also extra-dental ones like infections of the periodontal tissues originating either in old marginal infections or due to penetration of such through the tooth itself into the ramus of the jaw. There has been a world of nomenclature built around these different pathologic pictures—always the expression of foggy thinking and the sure background for misunderstanding regarding the principles which must guide us in their handling. I have previously insisted that the tooth is a living structure and that physiologically it is best conceived of as a living bone articulated with a second, the ramus of the jaw, the joint thus formed being lined by a synovial membrane similar to that lining any other articulation. Why, therefore, the needless terminology? When such structures are infected we have before us the pathologic states which, in plain English, are those characteristic of osteitis, osteomyelitis, arthritis and the problem of the fate of sterile or infected sequestra. I stress this point because what we need to consider in following certain orthodontic procedures is whether they are compatible with the principles of general surgery that are summoned to our aid whenever we meet these pathologic changes elsewhere in the human organism.

Resistance to infection is greater in living structure than in dead. Therefore every effort needs to be made by the dentist to conserve the life of a tooth. It is forgotten too often that the removal of a nerve from a tooth is accomplished always by the simultaneous removal of its central nutrient artery and that such a procedure kills not only the supplied tooth pulp but the inner portions of the body of the tooth as well. What is produced is dead bone or, in the terminology of the pathologist, a sequestrum; and there is no debate among

surgeons as to what is demanded in the handling of such a situation. If the sequestrum is sterile—too rare a situation in the case of the teeth—it can as such be tolerated, but no general surgeon attempts to-day to do anything else for an infected sequestrum except remove it. As I have emphasized before, our patients come to us ready-made, so that the child with carious teeth has from the start, in all probability, infected teeth and too often dead teeth. I emphasize the point because the drawing of deciduous teeth is a serious matter from an orthodontic point of view but it is also true that this type of infected tooth is the menace of the lives of too many children.

The problem which is here presented is probably the most delicate which the orthodontist is asked to meet. The death from any cause of a deciduous tooth delays its proper absorption and the eruption of the second tooth; its extraction makes for an approximation of the neighboring teeth and a probable false eruption of the second; its maintenance in the body in an infected state threatens the life and health of the child. I saw the whole story illustrated only yesterday in a child half-dead of heart disease and arthritis, the inception of the affliction coincident with the development of a "gum-boil" secondary to the caries of a deciduous first molar which a dental surgeon in the goodness of his heart had cleaned as best he could and filled, in order that maleruption and malocclusion of the adult jaw might not result\*. What, in such circumstances, is to be done? The choice is not that of good from evil, but that of the least of several evils. Deciduous teeth thus infected are dangerous systematically because they harbor partial tension organisms, in other words, organisms which grow better in the absence of oxygen than in its presence. Where the attempt is made to save such deciduous teeth it should therefore be accomplished by means which will in no way favor the growth and virulence of the infecting organisms. Such teeth should be treated by an open surgical method—in other words the teeth should be drilled into, obviously dead tooth structure should be removed and the hole left open. Under such circumstances drainage is maintained and the possibility for systemic infection kept low.

Every type of filling, either root canal fillings, temporary gutta percha fillings or permanent metal fillings, are to be avoided. By sealing away organisms in the absence of oxygen all these procedures become dangerous. Root canal fillings even when carried out with the conscience and skill of a Callahan are too frequently imperfect and even when perfect are fillers merely of canals in dead bone. The attempt is made often enough to destroy the infection in such a diseased tooth by an antiseptic pack of some sort. Whatever their nature, it must not be forgotten that packs which kill organisms will kill also living tooth structure or, penetrating beyond the tooth tips, the bony structure of the jaw itself.

\*I may add that the child recovered following the extraction of this single tooth.

What I have said regarding the filling of teeth holds also, of course, when infected structures are covered by crowns, bands or other dental appliances necessary to orthodontic practice. The day of the full crown is over in general dentistry and it will soon be over in orthodontic practice. The same is true of Richmond crowns or any type of dental structure pegged into dead tooth roots. In addition to the likelihood of sealing infection into a tooth through the placing of a crown, the full crown errs because of its impingement upon the gingival margin. If an infection is already established here it is made worse. If the edge is previously clean, it is now likely to become infected. What I have said of full gold crowns holds, of course, also for all bands placed about the teeth. The danger of infection is one hundred per cent. when such bands impinge upon the gum margin.

I have said enough to indicate how difficult is the problem which the modern orthodontist is asked to meet and how clear must be his judgment. He has to choose and develop ways and means which, while they accomplish his purpose of bringing into proper alignment badly placed teeth, do this without danger to their life, without aggravation of already existent infections and without the actual production of such in teeth previously healthy. I leave it to you to determine how far such an ideal is now being accomplished. I can tell you, however, from my own experience, that the development of grave systemic disease in children and individuals in their teens has been coincident too often with the initiation of orthodontic practices and that their clearing up has followed time after time only after the removal of orthodontic appliances which apparently capable men of your own profession insisted satisfied every requirement of modern practice.

5. Dental surgery had a great period with us some thirty years ago. It was a time when medical men skilled in the principles of pathology and surgery took pride in doing the surgery of the head and neck. Out of the throes of general surgery was born the dental surgeon whose name made famous our United States. Let it be remembered that these specialists were not short-trained, self-anointed souls. Their pupils too largely learned the tricks of the masters without their principles. There followed the dental schools, strong in mechanics and weak in the scientific foundations underlying their use. It is not worse with the orthodontists than with dental surgeons in general and not worse with these than with the general surgeons of to-day. But I believe that the day has come for a turning back and a relearning of the principles which made our forefathers great. Surgery is due for a renaissance and I sometimes think that it may come a little sooner for the orthodontists and dentists than it will for the surgeons in general.

## DISCUSSION.

*Dr. William G. Skillen, Chicago.*—It was with a great deal of hesitancy that I permitted myself to come here to discuss this paper because of the fact that I did not receive a copy of it to look over before the meeting. It always seems to me that it does not do justice to any of us to have a discussion on a paper without due and long consideration being given to it ahead of time. However, as I am here I shall endeavor to say a few words regarding it.

Every point the essayist has made is well taken, if we let alone the pulpless tooth situation and the effect of dental diseases on the general system, although I believe that those two things might be better over-emphasized for the dentist rather than underemphasized.

The one point I should like to amplify is that in dentistry, and especially in orthodontic procedures, we are dealing with vital tissues. Why are they vital tissues? Because they are formed, developed, maintained and controlled by cells. What are cells? Cells are simply workmen; they are living animals, and if we keep that in mind we won't lose the character of the structures with which we deal.

The ameba is an animal, and it is a cell, and it floats and swims around in pond water. It is doing throughout the day practically the same things that you and I are doing or that every other animal is doing on the face of the earth, only differing in degree. Is it going to keep up the same pace, day in and day out, or is that going to vary, and why is it going to vary? It is going to vary because of the condition of its environment. Its ability to carry on its work will depend on the amount of nutrition it will receive, and therein lies the point that I want to amplify which the essayist has well brought out, that those cells which have the making of the tissues with which you are working and upon which you are going to depend to rebuild the whole structure with which you deal are like the ameba, living animals—workmen. They look for their vitality and ability to carry out that work upon the general condition of the body. This is work of a nature in which you are interested. It is far more important for you to recognize the systemic reactions upon those cells than any other branch of dentistry. It is only by careful study of the vast effects that may be brought about by these cells that you can obtain a good knowledge of the effects that you get even from slight changes in any one part of the chain.

In this line a very interesting picture presented itself recently, an illustration in which, because of a slight distortion of one tooth, all of the tissues and the teeth for some distance on either side were involved. That is the extent to which these stimulations may go. I congratulate the essayist on bringing up one vital question of the effects of systemic conditions upon those cells with which you are coming in contact and upon which you are calling to do work.

*Dr. Theodore H. Bast, Madison, Wisconsin.*—It has been a great pleasure this afternoon to me to listen to Dr. Martin Fischer. I have always heard a great deal about him through the authorities at the University of Chicago, and I was certainly pleased to hear what he had to say this afternoon.

Dr. Fischer is a physiologist, and I am an anatomist, and an anatomist naturally would emphasize the physical or structural side more than a physiologist. However, I agree with Dr. Fischer that the anatomist certainly does not emphasize the functional element sufficiently. I stated in my paper yesterday that we must consider function in connection with structure. I believe that a tooth is a living structure as bone is. I think, however, it is quite essential sometimes that we should consider tooth structures in order to fully understand function. It may be all right to simply consider a tooth as a tooth or a piece of bone and the surrounding tissue as a mere socket. That may be all right from a certain functional standpoint. But there are certain structures—take, for instance, bone cells and their relation to the surrounding structure—which, if we know the details of their make-up give us a much better idea of

their function. Every part of the automobile is essential to make that automobile go—every structural part, and so I believe God Almighty put every single part in a bone for a definite purpose. Now we may be able to arrive at the functional significance of a structure as a whole and get a correct idea regarding it, but it oftentimes helps us to understand it better if we understand the details regarding it.

I was interested in the statement Dr. Fischer made that a tooth is a living structure, and that heat may destroy the surrounding tissue by cooking it. I too believe that. I have noticed that in suppurative processes, bone cells lying on the suppurative border are usually destroyed. And so any disinfectant which is too strong which you might apply, or even electrical stimuli, if too strong, will destroy the tissues immediately surrounding the part to which it is applied. These agents will destroy the cells, and if the cells are actually functioning, as they appear to be, and if they gradually control the tissue immediately surrounding them, then destruction of the cells, will also result in the devitalization of the matrix in which they lie.

I had occasion to talk with two gentlemen this morning who are connected with the University of Chicago, and both of them have come to believe that the function of these bone cells is a very important thing. Heretofore bones have been regarded as dead structures, but now we come to believe that these small bodies lying in the bone are the vital elements that control the surrounding structure. You cannot have function unless you have structure, and if you have structure, there must be a function. Therefore, if we have a full understanding of the function of an organ it is essential that we first know all the anatomical details of it.

*Dr. Leuman F. Waugh, New York City.*—It takes some courage to discuss a paper which has been so beautifully presented to us by a member of the medical profession and a teacher of prominence. However, there are two or three things which were said in that paper which I do not think as members of the dental profession we should let go into the literature without at least having an expression of the general feeling that exists among the students and investigators in our own profession.

I have enjoyed the many points Dr. Fischer brought out very much. I might say that my father was a dentist, and sometimes I feel as though I was conceived and born in dentistry. After fourteen years as a general practitioner of dentistry I was not sure whether I was anointed or the Lord called me to be a specialist. At any rate, I have practiced the specialty of orthodontia with all the sincerity and with all the ability that lies within me. I have recognized that in orthodontia we base our practice upon the general biologic sciences, and that if we would practice orthodontia as it should be, we will not be satisfied with studying the forces which move the teeth; we must delve into the structures in which effects are brought about. One must reason in terms of physiology and pathology and study the histology of the normal minute structure, and these together with physiology are the basis upon which all pathologic changes must be recognized. The essayist is quite right in what he said about "tooth saving" and the saving of living structure.

He has asked us to accept a tooth as a bone in a general sense. That might be all right if we were not delving deeply into a minute consideration of conditions. But it is not fair to compare teeth with bone. Bone is a connective tissue, of mesodermic origin, and a tooth is only a part of the mesoderm. It is partly of ectodermic origin, and the whole tooth is an appendage of the skin.

The essayist speaks of the dental pulp as being the only nutritive factor we have present in the human tooth, whereas, as a matter of fact, after the tooth has become fully erupted the nutritive quality of the dental pulp becomes progressively diminished as age advances.

The dental pulp has two factions, one of which is formative, and the other nutritive, promoting the function of building of the dental follicle. It begins at the stumps, what will be the crown of the tooth and lays down, according to the action of the odontoblasts, calcific matter. The

dentin builds from without inward. The more the dental pulp builds dentin, the smaller it becomes. It builds a calcified area or crypt in which it exists. As a tooth erupts its roots are not fully developed. Development or completion of the apex of the permanent tooth, when it is underlength, takes place in two to four years after the crown of the tooth has come through the gum, the canines being more complete in apical formation than any of the teeth. When the tooth pulp is complete, evidence occurs in which there is a period of physiologic rest, and it remains there until there is some outside irritant or stimulus to build more dentin. The dentin formed by the dental pulp is builded after the tooth has had a period of physiologic rest, the result of stimulus, or irritation, as secondary dentin. We may refer to the dental pulp as being perfectly insulated or protected beneath the unbroken enamel and normal dentin. If for any reason the enamel becomes thin, a reactionary effect is produced within the tooth structure for the purpose of restoring the original degree of insulation which existed in the tooth before the enamel was disturbed. It is the first effort on the part of Nature to restore the insulation of the dental pulp by tubular calcification, the process by which the tubules of dentin are gradually made smaller, due to the deposition of calcific material to its walls until the tubules become solidified, and the protoplasmic processes which extend into the tubules which convey nourishment to the dentin are impinged upon and crowded out. If the tubular calcification is insufficient to restore the original degree of insulation, the dental pulp is stimulated to form secondary dentin, and this it does up to the point of restoring the original protection which it possessed, and then it stops forming dentin. The osteoblasts may die as a result of overstimulation by which the deeper lying cells of the dental pulp take up the formative process. As the dental pulp builds more dentin it becomes smaller. As we grow older all the tissues of our body change and they become more fibrous. In the dental pulp the same changes occur, and it is at the time of completion of the root the dental pulp receives more and more nourishment as compared with the tissues of the body. When the dental pulp is irritated we find there is a gradual diminishing nourishment of the dental pulp. In this connection I want to pay my tribute to that great scientist, Dr. G. V. Black, who taught us twenty-five years ago the things I have been speaking about, and the dental profession has not grasped them yet. As we grow older the pulps in the teeth are converted immediately into the function of forming dentin, and again take on the secondary function of nourishing dentin, and the nourishment diminishes as we grow older. When the pulp in a tooth is removed it is absolutely not a dead tooth at any time in the history of that tooth. If the apices have been completed the nourishment within a tooth is not to be compared in quantity or quality with the nourishment given to that tooth from the copious blood supply that is ever present in the peridental membrane. A tooth without a pulp is not a dead tooth, and I wish the medical profession would please remember that.

Theory in science is valuable, but theories are only valuable as they may be applied in practice. Anything that does not work out in practice as it was worked out in the laboratory or in textbooks is not safe for practice and must be disregarded as a guide for practice. I do not say that every tooth with a dead pulp can be saved, but I do say it is a most unsafe principle for anybody to teach that a tooth because its pulp has been removed and its canal filled cannot be maintained in the human body in health and in efficiency. Clinical evidence bears out the fact that teeth filled in the older days by innumerable operators, even before such aseptic measures as the use of the rubber band were possible, before even surgeons recognized the value of asepsis in surgical operations, have lasted in the human mouth thirty, thirty-five, and forty years or more, without any evidence locally of disturbance, and what is more important, without any evidence in the entire system of disturbance.

It has another bearing on orthodontia. We may deceive ourselves often, although we observe carefully, relative to the strangulation and

death of dental pulps. Fortunately we see most of our cases when the patients are young. We do most of our work before the apices of teeth are closed. If we give the slightest attention to radiograms or to sections in our laboratory studies of the development of teeth, we find most of our teeth are moved best when the apices are wide open, when there is a copious blood supply, when it will be difficult for us to strangulate the pulp ends, which is quite different from the pictures presented to us of closing apices with tiny canals into which nerves and blood vessels enter.

I have radiograms of cases taken early in my experience in orthodontia, and I do not know from clinical evidence or radiographic findings of a single pulp with my methods of moving teeth, which are the same as yours, that caused death or injury of a dental pulp in a period of ten years.

*Dr. Fischer (closing).*—I sincerely hope that some of the other statements of my talk come nearer the truth than my remark that reasonable men always agree.

There is an experiment which I cite to my students to illustrate the difference between a living structure and a dead one, and its liability to infection. A freshly granulating surface such as may be seen in a healing burn of the skin may have a culture of staphylococci or streptococci poured over it with little hope of infection; but let this be followed by the slightest injury to the growing cells,—a bit of gauze dragged over them will do—and the whole surface will be bathed in pus in a few hours. If you want to know one of the reasons why the older surgeons got the brilliant results so frequently missed in our modern day, it was that they worked with defter hand. The older man got good results even without aseptic technic, because he did little injury to his patient. Bacteriologists will tell you that our modern “aseptic” surgical technic is still not a technic free from bacterial infection. Couple this fact with a reduced mechanical skill and many of the bad results in modern surgery will be explained to you. I heard a surgeon say twenty years ago that he would rather have a man who cleaned his hands with soap and water and had a light touch enter his abdomen than one who devoted forty minutes to scrubbing and antiseptic baths. The latter with his roughened skin has, in fact, also a dirtier one, bacteriologically. Let him injure more than necessary his surgical subject and a bad result is inevitable. If you do not believe what I say, follow the day's work of several extractionists. Their offices carry a fairly even type of initial mouth infections. But the results of the surgery practiced are vastly different. Why should it be that the patients of those who have weak arms, use nitrous oxid anesthesia, little local pressure, little adrenalin and small amounts of local anesthetic should get the least local reaction, the quickest healing and the most comfortable jaws, while those whose arms are heavy and whose hands are “Westphalia hams” get so definitely opposite results?

Adrenalin and all local anesthetics make for lack of oxygen in the affected cells and thus an ideal culture medium for the bacteria stirred to life through an extraction. Scrupulous care in their use and a minimal amount of traumatism—these are the things that save the surgical day.

I know that the histologists can demonstrate certain differences between bone and tooth structure, but I again insist that such structures do not make for functional differences, but vice versa. The structure given a tissue or organ through birth is the expression of the uses to which that tissue has been put by preceding generations. We can keep the heritage and develop it only by similar and further use. The involuntary muscle of the higher animals develops cross striations is worked hard enough; and cross striated muscle becomes smooth in type through nonuse.

I regret that I did not bring out the fact that the dental pulp is not the only source of nutrition to the tooth. There is the periodical supply, but this is quantitatively insignificant as compared with the former. It needs also to be remembered that no adequate anastomoses exist between

the two to permit of a collateral circulation to the supplied tooth structures if either is destroyed. The peridental supply will not, for instance, maintain the life of the inner portions of the dentine after the central artery to a root has been fished out or twisted off as is so commonly taught. It is true, too, that irritation of tooth structure is followed by new bone deposition. No one denies these things. But such regeneration will not occur in a tooth without blood supply or in dead tissues. What is frequently regarded as regenerating tooth structure in a killed tissue is nothing but the ingrowth of connective tissue into a necrotic mass which Nature is doing her best to absorb.

I have discussed the question of the maintenance of devitalized teeth many times before. The answer is perfectly clear. If a noneroded tooth, for example, has had its blood supply twisted off it is a three-quarters dead affair. If not infected from without or through the blood stream it constitutes a sterile sequestrum and like every clean foreign body can be tolerated. Dentists and patients who wish to carry their own life insurance may preserve such structures. Too often, however, the tooth is eroded or a marginal infection is present or an infection in some fashion or other becomes superimposed. We then have the tooth a part of that general junk pile of devitalized teeth, of which more than 97 per cent. are infected according to the x-ray studies of your own colleagues. If a patient harboring such structures has constitutional disease also they had best be given consideration. Denial of the existence of infection by a dentist does not mean that none is present.

I make a similar answer to the question of strangulated pulps. As I have already indicated, the danger of strangulation is less in young children and when slow, moderate and monodirectional movements are carried out than when larger movements or twists are made in older individuals. Such strangulation can and does occur in perfectly normal, non-infected, noncarious and nonfilled teeth. It is idle to deny this or the nature of the changes which follow strangulation.

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## George B. Snow, Deceased

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THE sad news of the death of Doctor George B. Snow reached Toronto, February 20th, 1923. Dr. Snow passed away during the night of Feb. 15th, at the ripe age of 88 years.

The passing of Dr. Snow marks the close of a long and unusually useful and active life. To the dental profession of Canada he is perhaps best known through his long period of service as Dean of the Dental Department of the University of Buffalo, and through his frequent contributions to dental literature, and through his inventions.

Dr. Snow was Professor of Prosthetic Dentistry in the institution, and successor to the late Dr. Barret as Dean, until about fifteen years ago he was obliged, through failing health, to resign, being succeeded by the present Dean, Dr. Daniel H. Squires. Dr. and Mrs. Snow then moved to the more benign climate of South California, locating in a delightful home in the city of Long Beach, on the shore of the Pacific Ocean, a few miles out of Los Angeles. It has been the writer's privilege to enjoy the hospitality of this.

Throughout his long life, and during the years of his retirement,

Dr. Snow labored with mind and hand for the betterment of Dentistry, and thus for his fellow-creatures. His published investigations, both in pamphlet form and in literature, on the vulcanization process of rubber as applied to dental appliances, and on Anatomical Articulation, are basic to the present day practices.

Dr. Snow combined the rare gifts of an investigator, an administrator and a mechanical genius. Trained as a high-class tool-maker before entering upon the study and practice of dentistry, his mind became intensely active upon problems dealing with the mechanical side of Dentistry. The Snow face bow, the various Snow Articulators, Vulcanizing Apparatus, and many other and varied inventions stand as an enduring memorial, and have, in their particular field, never been since equalled. The variety and scope of Dr. Snow's inventions became so great that a separate manufacturing company was formed for the sole purpose of giving the dental profession the fruit of his inventive genius. This concern has grown to be of considerable size, as is well known, through the use which the dental profession has made of Dr. Snow's inventions. There has been, in consequence, an enduring stamp upon the practice and the quality of professional service possible by dentists, which will be felt for many decades.

During the evening of life Dr. Snow conducted extensive researches on the control of vulcanized rubber at his home in Long Beach, and kept in close touch with professional and research activities within his chosen sphere by correspondence over the entire continent.

During the last meeting of the American Dental Association, Dr. Snow was honored by the Full Plate Section, officially known as the National Association of Denture Prosthetists. On Sunday, July 9th, 1922, this entire body, with many friends, travelled to Dr. Snow's home bearing good wishes and felicitations, and presented him with a handsome silver vase, and elected him to the office of Honorary President of the Association, made vacant by the demise of Dr. Geo. H. Wilson. This event was chronicled at length by the daily press of Los Angeles and Long Beach.

It has been the rare privilege of the writer to have held the friendship and fairly close association of Dr. Snow for fifteen years, and many times, either through letters or personal contact, to have been guided and inspired by his greater experience and kindly counsel.

Those who knew him well will always cherish the memory of a fine, strong, active life, full of such good works as his hand found to do; and, above all, a deep, quiet, if rarely spoken, Christian hope and faith for his place in the infinite sphere upon which he has just entered.

W. E. C.

# JUVENILE JINGLES

*Contributed to ORAL HEALTH by Dora L. Cameron,  
Wenatchee, Wash.*

## Plenty of Exercise—Mastication

**E**XERCISE, exercise, do it every day,  
Eating lots of plain, hard food, that's the only way:  
Carrots raw, and celery too, anything you like  
Requiring you to grind with care every single bite.  
Make your jaws like iron bars, strong as they can be,  
Then you will be strong yourself—you just watch and see.

## A Wise Wee Lad

**S**AID a wise wee lad,  
As he ate his mush,  
"When breakfast is over  
I'll get my brush,  
So not one speck of mush can stay  
In some dark corner tucked away."

Said the same wee lad,  
When his lunch was done,  
"It takes just a minute;  
I'm going to run  
And brush my teeth, lest there should stay  
One little crumb to start decay."

"Ho! ho!" said the lad,  
"Now dinner is through,  
The very first thing  
I am going to do  
Is brush my teeth with greatest care,  
So not one speck of food be there."

So he brushed his teeth,  
And he gargled, too,  
The way careful children  
At bedtime should do,  
Then showed his Mother, who was glad  
That he such perfect white teeth had.

## Your Smile Shows What ?

What does your smile show? I'd like to know.  
Pearly teeth glistening? I surely hope so.  
No sign of tartar, nothing to mar  
That merry smile, darling, that people admire?  
Keep right on smiling, there's nothing to fear,  
If behind the smile peeping are perfect teeth, dear.



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### MARITIME PROVINCES.

THE programme for the February meeting of the Halifax Dental Association was a discussion, by the members, of the paper by Dr. B. Tishler on "Is Occlusion a Primary or Secondary Factor in the Etiology of Periodontal Lesions?" which appeared in the *Cosmos* for January, 1923. The discussion was most interesting.

Dr. G. K. Thompson thought that traumatic occlusion does exist in 90 per cent. of cases of periodontoclasia. He stated that he made very little use of medicaments in his practice, but depended on root surgery and correction of traumatic occlusion in his treatment of cases. He felt that most dentists confused traumatic occlusion with malocclusion, and mentioned a case he had seen in Dr. Stillman's office, where the patient had a healthy mouth, with the exception of two pockets on the lower incisors, which were cured simply by the correction of traumatic occlusion.

Dr. F. W. Dobson thought that the resistance of the tissues played a more important role than traumatic occlusion.

Dr. G. A. Chudleigh gave the history of a patient with a porcelain crown on a central incisor. The soft tissues around the root were much inflamed and engorged. It was noted that the crown hit rather heavily in certain movements of the mandible; the case showed marked improvement when these were relieved. He said that he had seen the statement made that 90 per cent. of the people had lost some or all of their first permanent molars, and if this were true they must have a greater or lesser degree of traumatic occlusion. But since 90 per cent. did not suffer from periodontoclasia, the determining factor must be the ability of the body to withstand the infection, and that traumatic occlusion must be considered a secondary factor.

Dr. R. H. Woodbury felt it was a difficult question to decide when sufficient grinding had been done to relieve the traumatic occlusion. He felt that periodontoclasia was a disease with many

phases and probably a number of causes, and that it would be a mistake to stress too much the importance of traumatic occlusion, and thus lose sight of some other important factors.

\* \* \* \*

An article appeared in one of the Sydney, Cape Breton, papers lately, giving the applications received for the position of public school dentist for that city. This work had previously been carried on by a number of the dentists of Sydney, who each devoted one half-day a week to the work. It is noted that two graduate dentists applied for the position; one requested \$100 a month for full-time work, and the other \$125 a month. The clinic is to run ten months in the year. Well, times have been rather hard, but we have felt that a graduate dentist should be able to make a living salary after he has devoted four years, at least, to learning his profession.

\* \* \* \*

A case which happened recently is rather interesting, as it illustrates the methods used in some advertising offices to sell work. A patient, who required a full denture, went into one of these offices. He stated his requirements and asked for one of their \$10.00 plates. He was shown a tray full of plates, and told that if he could find one to fit his mouth he could have it for \$10.00. The search was unsuccessful. The proprietor then advised him that he had a difficult mouth, and that it would be necessary to make a plate specially for him. The charge for a special plate would be \$25.00; but they had a better quality plate, on which they would put a gold crown, which would cost \$30.00.

J. S. B.

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## ONTARIO.

### DENTAL PUBLICITY.

EVERY reader of this magazine knows that the general attitude of the Dental Profession is averse to any publicity which may be characterized as advertising. The dignified business card in the press has been the extent to which the profession has favored individual announcement.

The purpose back of this attitude towards brazen announcements has been at all times commendable. Nevertheless, the code of ethics of a few dentists has not always been that of the Dental Association. As time goes on there has appeared to be a growing tendency on the part of these few men to magnify their spurious claims and further mislead the public.

Dental scientists are constantly developing light on the close relationship of dental health to the general well being of people. The public are not fully realizing the importance of these findings, and an increasing amount of suffering and death preys upon people because of this lack of appreciation of dental truths.

These two conditions led to the appointment of a committee composed of three representatives by the Ontario Dental Society and three by the Board of Directors of the Royal College of Dental Surgeons.

After carefully weighing the existing problems this committee decided that some educational work should be inaugurated forthwith, and that the daily Press should be used for this purpose. A series of bulletins was planned and thirty leading newspapers distributing over the province were selected.

The bulletins have contained a clear and forcible statement of points which demonstrate the importance of dental service. Each bulletin is prepared by a member of the profession and is placed before the committee for criticism. This criticism is at once constructive and severe. The sole object of the committee is to make each message as educative to the public as possible. The subjects dealt with so far are:

Bulletin No. 1:

The Care of the Mouth and Teeth.

Bulletin No. 2:

The Value of Human Teeth.

Bulletin No. 3:

The Economy of Frequent Dental Service.

Subsequent bulletins will deal with:

Teeth and Health.

Children's Teeth.

Mouth Cleanliness.

The Relationship of Diet to Dental Health.

The Economics of Dental Service from the Standpoint of the Individual and Community.

The bulletins appear on Saturday of each week.

It is the purpose of the committee to present the whole matter of public dental education for discussion at the coming convention of the Ontario Dental Society in May, so that the views of the whole profession may be ascertained and a further policy developed.

W. G. T.

## SASKATCHEWAN

At a recent meeting of the executive of the Saskatchewan Dental Association, May 31 and June 1 and 2 were named as the dates on which the annual Convention of this Association will meet this year.

This Association, although one of the youngest of the Dental bodies in Canada, is one of the most virile and already has an enviable record behind it.

The various executives that have been in charge from year to year have left nothing undone to make each convention both pleasant and profitable to the members of the profession who attend.

Some of the most eminent dental teachers of the continent have appeared before the convention and given of their best.

A group of earnest dentists with a keen desire to better themselves to the end that they may render a greater service to their clientele, cannot spend a week with such men as Orton and Best of Minneapolis, C. N. Johnson of Chicago, Webster of Toronto, Thornton of Montreal, or F. E. Roach of Chicago, and not be inspired to greater service.

It has been decided this year to bring to Regina to the Annual Meeting Drs. H. J. Merkley and M. H. Garvin, of Winnipeg, to deliver a series of lectures. These are practical men—to a degree—and it is anticipated that the convention this year will be bigger and better than ever.

Saskatchewan dentists will appreciate very much the honor of having with them at this meeting any eastern dentists who can find it convenient to be present.

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DR. A. W. LANE.

DR. W. D. COWAN.

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## Bi-Centenary of Pierre Fauchard

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THIS year marks the two hundredth anniversary of the completion of the writing of Fauchard's "Le Chirurgien Dentiste."

The First District Dental Society and the Dental Society of the State of New York has seen fitting to commemorate this event, by an exhibit during the State Meeting of early dental literature and other historical material. Thursday evening, May tenth, will be devoted to a series of addresses by Dr. J. J. Walsh, "Medicine and Dentistry"; Dr. Herman Prinz, "Fauchard and His Works," and "Influence of Fauchard on Dentistry."

The above societies extend an invitation to all members of the profession to be present.

B. W. WEINBERGER,

Chairman.

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## EDITORIAL

### An Important Advance in Dentistry

DR. HAROLD K. BOX, of Toronto, made a rather interesting statement in conversation with the Editor recently, namely, that he had been able to establish as a scientific fact the re-attachment of the soft tissues to the cementum following clinical treatment of periodontal pus-pockets.

Many cases of apparent re-attachment have previously been cited, but these findings have not been generally accepted because of lack of microscopic evidence. Dr. Box is now able to bring forward substantiating proof of re-attachment, and this will doubtless have a marked effect upon treatment and clinical management of these cases, and sets a new objective for the dental practitioner.

A periodontal pus-pocket has been defined by Dr. Box as a lesion produced by the establishment of infection in the cemental gingiva and pericementum, whereby through suppurative process these tissues have been detached from the cementum. *True pyorrhoea alveolaris* is characterized by the presence of a more or less extensive pocket at the neck of the tooth, which has been preceded by a rarefaction of the alveolar process, the dominating lesion. The inflammatory changes in the alveolar process are secondary phenomena, which are added later. The phenomena of rarefaction of the alveolar bone, in true pyorrhoea alveolaris, are in association with the periodontal pocket either as *cause* or *effect*. True pyorrhoea alveolaris is termed,

by Dr. Box, Chronic Suppurative Periodontitis Complex.

A periodontal pus-pocket is also found in a pathological ensemble in which a gingivitis has been the dominating lesion, and in which the rarefaction of the alveolar bone has been brought about by the progress of inflammation. This *pseudo* pyorrhoea alveolaris is termed Chronic Suppurative Periodontitis Simplex. In Chronic Suppurative Periodontitis Complex, the progression, in the main, is centrifugal, while in the Simplex type, which simulates in its mature state the true pyorrhoea, the progression is centripetal.

The existence of a very shallow pocket has been frequently noted in the cemental gingiva, both clinically and microscopically. This lesion may represent the second phase of Chronic Suppurative Periodontitis Complex, the first phase of Chronic Suppurative Periodontitis Simplex, or it may persist for years with little progression as a chronic gingivitis. This condition, according to Dr. Box's classification of periodontal disease, is termed Chronic Suppurative Gingivitis. A pus-pocket, then, is a common pathological factor in three distinct forms of dental periclasia.

Scientific treatment of Chronic Suppurative Periodontitis, Complex and Simplex, has for its primary object the obliteration of the periodontal pocket, and the recalcification of the decalcified matrix of the alveolar process, or the prevention of its further rarefaction.

No true conception of dental periclasia can come until a correlation between structure and function is made. Scientific investigation of periodontal disease was initiated in a period in which methods of research were dominated by a structural pathology, and from the outset was under its sway. Without the present functional point of view, the judgment of the dental profession as a whole has been unfavorable as to the possibility of elimination of these disease processes by treatment. In fact, there has developed for many practitioners a scepticism towards periodontal therapeutics that in some instances has intensified into a veritable nihilism.

An understanding of the functions of the teeth and their supporting structures, combined with a viewpoint of their normal and pathological anatomy, has led to the truth that great regenerative processes are possible, and a consequent change of opinion as to the possibility of improvement and obliteration of periodontal disease, when proper measures are taken.

That apparent re-attachment to the cementum of the separated soft tissues takes place, thus completely obliterating the periodontal pocket, has long been noted by expert periodontists. That regeneration of the alveolar bone, or, at least, recalcification of the previously rarefied matrix following skilful treatment, does take place, has also been recorded.

As a periodontal pus-pocket and a rarefaction of the alveolar process constitute the pathological composite in Chronic Suppurative Periodontitis, it therefore follows that the conditions pre-requisite to a cure of these diseases are obliteration by re-attachment of the separated tissues to the cementum, and a recalcification of the matrix of the rarefied process, or, at least, a cessation of that rarefaction.

Electrotypes are being prepared, and in an early issue of ORAL HEALTH, Dr. Box will submit evidence to prove re-attachment and recalcification as outlined above.

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## Government Grant to Royal College of Dental Surgeons of Ontario

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THE Ontario Government has included in the estimates, presented to the Legislature a few days ago, the sum of \$25,000 as a grant to the Royal College of Dental Surgeons of Ontario. The Minister of Education, the Honorable R. H. Grant, is ex-officio a member of the Board of Directors of the College and has taken a special interest in the problems of the College and particularly in the returned soldiers.

Grants that have been made to the College by the Provincial Government during the past few years have been for the purpose of enabling the College to defer payment of tuition fees of War Veterans who find themselves in such financial embarrassment as to prevent their proceeding with their courses without some assistance. The University of Toronto Alumni Association has also been most generous toward war veterans in attendance at the Dental College, and has given the dental men every possible consideration.

The War Veterans in attendance at the R.C.D.S. have expressed their sincere thanks and appreciation both to the Ontario Government and to the University of Toronto Alumni Association for the assistance given, and without which these men could not have proceeded with their studies.

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## Dr. W. D. Cowan Suffers Illness

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WE regret to learn that, as a result of a severe fainting spell, the Secretary of the Dominion Dental Council, Dr. W. D. Cowan, former Mayor of Regina and ex-Federal Member of Parliament, has been confined to his home for some days. Dr. Low, his physician, stated that his condition was serious, but not at all dangerous. Dr. Cowan was overcome while at the People's Forum. He was taken to his home in an ambulance, and though somewhat dazed, was resting easily by night.

# ORAL HEALTH

A JOURNAL THAT STANDS FOR THE "OUNCE OF  
PREVENTION," AS WELL AS THE "POUND OF CURE"

VOL. 13

TORONTO, APRIL, 1923

No. 4

## Specifications for Partial Denture Service

W. E. CUMMER, D.D.S., TORONTO,  
ROYAL COLLEGE OF DENTAL SURGEONS OF ONTARIO.

### CONTENTS.

1. Specifications for Partial Denture service.
2. Basis of Design of this Chart.
3. Plan and Elevation.
4. Type of Restoration.
5. Standard Parts.
6. Construction Data.
7. Charts suitable.

THE specifications of the engineer, relating to large engineering projects, involving large sums of money and multitudinous detail, usually accompany the designs to the construction companies. These are more or less lengthy documents, sometimes reaching the proportion of bound volumes, in which the most precise and comprehensive phraseology and arrangement is used.

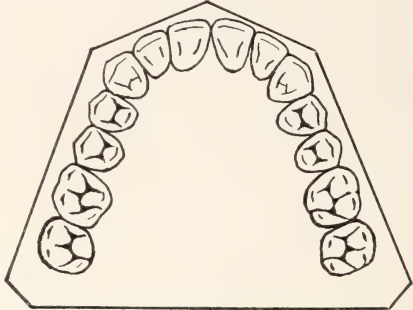
In dental construction this is necessary in part only, and when such dental construction is above a certain grade of difficulty, and not under the immediate supervision of the dentist-designer. In Figs. A and B are shown the face and reverse sides of forms which will be found useful in collaboration with laboratory men whose laboratories are not under the same roof with the dentist.

## Design, Specification, and Construction Chart

Received M. 192...	From Office of..... Telephone.....	Patient's No. .....
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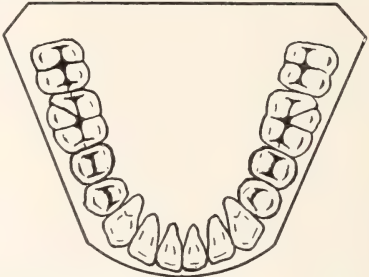
PLAN AND ELEVATION OF WORK DESIRED.

Detail.



Detail.

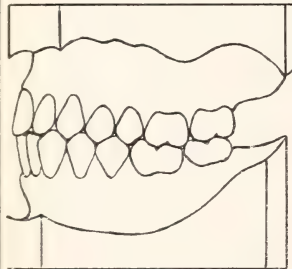
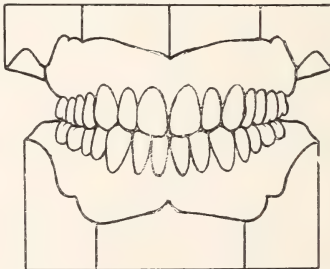
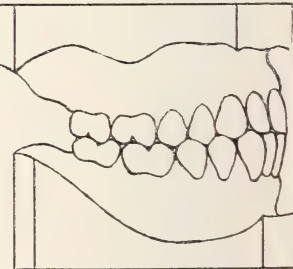
PATIENT'S RIGHT SIDE



PATIENT'S LEFT SIDE

NOTE.—Third molars to be sketched in if necessary.

Details of construction to be indicated as desired.

NOTE.—Sketches in Elevation only necessary when Buccal and Labial details are required to be marked. For Colors (Higgin's Ink)—Outline, India Ink ; Gold, Orange or Gold Ink ; Vulcanite, Crimson Ink.

TYPE OF RESTORATION.			
UPPER : To be marked U and type.		LOWER : To be marked L and type.	
1. Inlay	2. Crown.	3. Fixed Bridge.	4. Rem. Bridge with Compound Retainers.
5. Rem. Bridge with Clasps, Etc.	6. Partial Denture.	7. Full Denture.	8. Other Types.

FIG. A.—**Face Side of Specification Chart.**—\*This sized Chart will fold three times in letter size envelope. The Plan and Elevation forms may be used for Design as well as Specification purposes. Note that patient is given a number rather than the name. Under the head of Type of Restoration, this is designated in the square allotted. The writer wishes to acknowledge assistance in this chart to Drs. Bothwell, Ante, Switzer, Messrs. Byrne, Rollaston, Regan, and others.

\* Arrangements may be made for the use of plates which will print that part of Figures A and B below the double line by writing the College.

To ..... Laboratory

TO .....		LABORATORY .....	
Order No. .... Yours .....	Wanted .....	M .....	192 ...
Order No. .... Ours .....	Wanted .....	M .....	192 ...
To .....	Wanted .....	M .....	192 ...
(For Final Insertion)			

From Science Chart issued by R.C.D.S.		STANDARD PARTS.		Details to be filled in, as type, materials, etc.
<u>1. Crown and Bridge</u>		<u>2. Base, materials, etc</u>	<u>3. Attachments.</u>	<u>4. Teeth.</u>
1. Post or Pin.		(Skeleton, Continuous, Full)	(Joining Teeth to Base)	1. Number. X
2. Cope or Cap.				2. Mold.
3. Backing or Tip.				3. Hue or Color.
4. Cusps or Dummy.				4. Make.
				5. Kind.*
				6. Sulcus Angle.
				7. Other Detail.
				* Plain, Facings, etc.
<u>5. Retainers.</u>		<u>6. Connectors.</u>	<u>7. Occlusal Rests.</u>	<u>8. Special.</u>
(Simple, Compound, Direct, Indirect)		(Joining Retainers and Occlusal rests to Base)	(Surface, Recessed)	

From Practical Charts issued by R.C.D.S.		CONSTRUCTION DATA.		Details to be filled in
<u>1. Prelim. to Model</u>	<u>2. Model.</u>	<u>3. Assembly.</u>	<u>4. Taking Bite</u>	
<u>5. Anterior Teeth.</u>	<u>6. Posterior Teeth.</u>	<u>7. Carving and Finishing.</u>	<u>8. Other Data, Repairs, Etc</u>	

FIG. B.—Reverse Side of Chart, Fig. A.—Above the double line are found routine details, below the double line. Standard Parts and Construction data as found on Standard Parts Chart (Fig. 2) and Construction Chart (Fig. 9) as described in text in Bulletin No. 5, Canadian Dental Research Foundation. This detail includes Specification data for Crown and Bridge work, Partial Denture work, and Full Denture work.

## 2. BASIS OF DESIGN OF THIS CHART.

The chart, when filled in with specifications of a particular case (which is sufficiently complex to require specifications), will include:

1. A drawing with notes, in plan and elevation of proposed restoration.
2. A brief description of the type of restoration.
3. A description of each standard part in the proposed restoration.
4. Data as to the manner in which it is desired that these standard parts be assembled.
5. Routine details, as order numbers, time wanted, etc.

The Chart is designed to cover all types of Prosthesis, including Crown and Bridge, Partial Denture Work, and Full Denture Work, and is arranged on the basis of suggestion, as noted below.

## 3. PLAN AND ELEVATION.

Below the double line on Fig. A, will be found the forms for Plan and Elevation of restoration desired. The Plan forms may be used in developing the Design, and showing the position and approximate form of the constructional parts, and if desired may be filled in in color, as suggested. Notes may be made opposite each construction part as sketched in. The Elevation forms are useful to show such data as labial and buccal appearance of standard parts, pink gum to be over teeth, or teeth to be fitted to natural gum, and similar.

## 4. TYPE OF RESTORATION.

This section is found on the face of the Chart, Fig. 12 A, and suggests the type of restoration. Below each restoration, noted in spaces from 1 to 8 is a space in which the initials U for upper and L for lower and also the type may be inserted. For example, the designation of an upper fixed bridge with Richmond and  $\frac{3}{4}$  Crown abutments would bear, in space No. 3 "Fixed Bridge, U, Richmond and  $\frac{3}{4}$  Crowns," as noted in plan. The remaining detail will be found sketched in Plan, and if necessary, Elevation immediately above.

## 5. STANDARD PARTS.

In this section details are *suggested* by the headings of all the standard parts as found in Prosthetic Dentistry. Space No. 1 has been designated by Prof. Ante as containing, with the remaining spaces, all the standard parts necessary for Crown and Bridge work. Spaces Nos. 2 to 7 contain all the standard parts necessary in Partial and Full Denture work, while the remaining space will include special parts as found in such as surgical prosthesis, obturators or other special types of restoration.

To a busy dentist the suggestion of detail is valuable. For ex-

ample, in space No. 4 the full data regarding porcelain teeth is suggested. Without this an omission might occur of one of the details, say for example, the sulcus angle. With this detail before him, also, the danger of misunderstanding by the laboratory man by omission of necessary detail is minimized.

## 6. CONSTRUCTION DATA.

In this section, the ordinary sequence in Prosthetic construction is included in eight sections, each section *suggesting* detail which might otherwise be omitted. Both the Standard Parts and Construction data sections are based on the Standard Parts chart (Fig. 2) and Construction Chart (section 2, Fig. 9). Bulletin, Canadian Dental Research Foundation No. 5.

## 7. CHARTS ARE SUITABLE FOR EITHER DENTISTS OR LABORATORY MEN.

By transposing the names on the dotted lines above the upper double line in Fig. A and B, this chart may be used for laboratory men.

In filling out the spaces on the left for Dr. .... in Fig. A and ..... Dental Laboratory, Fig B a small font of rubber type may be used, by which the name of the dentist or laboratory may be easily stamped by an assistant.

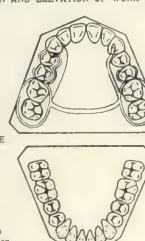
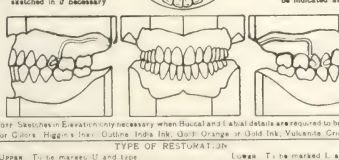
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DESIGN, SPECIFICATION, AND CONSTRUCTION CHART																																										
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To Allen & Rollinson.		Received 10 A. M. Feb. 17 1923		Telephone Trln. 30		240 COLLEGE STREET, TORONTO		Wanted 2.30 P. M. Feb. 24 1923.																																		
<div style="display: flex; justify-content: space-between;"> <div> <p>PLAN AND ELEVATION OF WORK DESIRED</p> <p>Detail</p>  <p>PATIENT'S RIGHT SIDE</p> <p>PATIENT'S LEFT SIDE</p> <p>Note: Third molars to be extracted if necessary</p> <p>Details of construction to be indicated as desired</p>  <p>Note: Speeches in Elevations necessary when Buccal and Labial details are required to be marked for Colors. Higgins (Ivory), Gubine (Ivory), Gold (Gold), Gold (Gold), Vulcanite (Gum), Gum (Gum).</p> <p>TYPE OF RESTORATION</p> <p>Upper: To be marked 1 and type</p> <p>Lower: To be marked 1 and type</p> <table border="1"> <tr> <td>1. Inlay</td> <td>2. Crown</td> <td>3. Fixed Bridge</td> <td>4. Rem. Bridge with Compound Retainers</td> </tr> <tr> <td>5. Rem. Bridge with Class. Ret.</td> <td>6. Partial Denture</td> <td>7. Full Denture</td> <td>8. Other Types</td> </tr> </table> <p>Upper D. 2.</p> </div> <div> <p>From Science Chart issued by R.C.D.S.</p> <table border="1"> <tr> <td>1. Crown and Bridge</td> <td>2. Base, materials etc.</td> <td>3. Attachments</td> </tr> <tr> <td>1. Post or Pin.</td> <td>(Skeleton, Continuous, Full)</td> <td>(Joining Teeth to Base)</td> </tr> <tr> <td>2. Cope or Cap</td> <td>Gold Saddles and bar.</td> <td>Solder cuspid, vulcanize molars.</td> </tr> <tr> <td>3. Backing or Tip</td> <td></td> <td></td> </tr> <tr> <td>4. Cusps or Dummy</td> <td></td> <td></td> </tr> </table> </div> <div> <p>STANDARD PARTS</p> <table border="1"> <tr> <td>4. Teeth</td> <td>5. Special</td> </tr> <tr> <td>1. Number 1</td> <td>2. Mould 3 P</td> </tr> <tr> <td>3. Hue or Color 10</td> <td>4. Mass "P. C.</td> </tr> <tr> <td>6. Kind "</td> <td>7. Other Detail</td> </tr> <tr> <td>* Plain, Facings, Etc.</td> <td></td> </tr> </table> </div> </div>										1. Inlay	2. Crown	3. Fixed Bridge	4. Rem. Bridge with Compound Retainers	5. Rem. Bridge with Class. Ret.	6. Partial Denture	7. Full Denture	8. Other Types	1. Crown and Bridge	2. Base, materials etc.	3. Attachments	1. Post or Pin.	(Skeleton, Continuous, Full)	(Joining Teeth to Base)	2. Cope or Cap	Gold Saddles and bar.	Solder cuspid, vulcanize molars.	3. Backing or Tip			4. Cusps or Dummy			4. Teeth	5. Special	1. Number 1	2. Mould 3 P	3. Hue or Color 10	4. Mass "P. C.	6. Kind "	7. Other Detail	* Plain, Facings, Etc.	
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Figure C. A SAMPLE CHART FILLED IN WITH DETAILS.

This Chart contains both Charts in Figs. A and B, but on one letter sized sheet. Outside slight rearrangement the detail is the same. Detail supplied by Mr. F. M. Lott, Royal College of Dental Surgeons, upon a chart, similar to the foregoing, which is in use at the College.

# Mandibular Autogenous Bone-Grafts

FULTON E. RISDON, M.B., D.D.S.

ROYAL COLLEGE OF DENTAL SURGEONS OF ONTARIO.

THE treatment of non-union of the lower jaw with free bone-grafts taken from other parts of the patient's body has been practised for some years with more or less success, and during the Great War the experience previously gained in this field by many operators was of great value. The literature on this particular subject previous to the war was not as encouraging as desired, as authors maintained that the grafts in this area did not take well. Others reported that two to three or even more operations might be necessary. The experimental work in bone regeneration was very encouraging but not conclusive, as Ollier maintained that periosteum was not necessary for bone regeneration, and McEwen took the opposite view. Gallie and Robertson of Toronto did some excellent work on this subject, attempting to prove that the graft was a scaffold for the new bone and was itself absorbed. They did not consider that the periosteum was of much value. This work was done on dogs, and no doubt is one of the best contributions in bone-regeneration.

The indications for bone-grafts in the mandible area:—*non-union* following gun-shot wounds, including violence of any type; *pathological fractures* where cysts have caused absorption; and in some cases where malignant disease has necessitated a radical operation and considerable of the lower jaw has been lost. In the latter case the operation should be deferred until the likelihood of recurrence is remote.

It is wise to investigate all these cases thoroughly before deciding on an operation, and it is recommended that all signs of infection must have disappeared for six months,—that is, all sinuses in and about the area to be grafted should have healed for about six months. Further, teeth with infected areas surrounding their apices should be considered as sinuses and removed six months previous to the operation. This means that a routine inspection inside and outside the mouth be made, and good roentgen rays obtained. The small dental film is not used in this type of case, except to exclude infection in and about the teeth, and as a rule the large plates will give this information.

It is taken for granted in this article that the dentist and the surgeon are co-operating for the patient's benefit. In these cases the dentist must advise what teeth are to be retained, make the splint for placing the jaws at rest during the healing, and plan for his prosthetic appliance subsequently. He should also decide what width of the arch he desires and construct his splints accordingly. His responsi-

bility is a heavy one and experience in treating this condition is not to be gained in all hospitals, due to the fact that few cases present, needing a bone-graft in the jaws. The literature since the war is most complete, and one will be well repaid for reviewing it, if an operation is necessary.

The surgeon cannot hope to accomplish the best results working alone, so in this article I cannot give a good detailed account of the making of the splints, as this is invariably done by my dental colleague. I have been very interested, though, in this construction, and believe the best results are obtained when an upper and lower cast cap splint is constructed of Victoria metal supplied by Claudius Ash & Sons, and fastened together with two short tubes on the upper and one on the lower, interlocked by a metal pin. It is understood that the short tubes in the upper splint are so placed far enough apart that, when the one in the lower comes in between the two in the upper, a metal pin can be pushed home, holding the jaws together. These are cemented three days before the operation with Ames copper cement, and left in position for three months.

The operation is a tedious one. Bone is obtained from the crest of the ilium and fastened in position with wire. The neck incision is about five inches long and the two ends of the non-united fracture of the mandible are uncovered, and about one-half inch of bone trimmed off each end,—or until bleeding bone is seen. A small hole is drilled through each fragment and the wire threaded through so that it may engage the graft, which has been drilled in both ends.

The technic is the trying part of the operation, as the glove is not permitted in the wound and all sponging of the wound is done with freshly sterilized forceps. One fertile source of failure is opening into the mouth, but if noticed, the operation is discontinued, as this means infection and free bone-grafts seldom take if any contamination occurs. It is a well-known fact that the operation is difficult because of the care necessary to exclude the ingress of bacteria either through accident in opening into the mouth during dissection, or by carelessness of the assistant nurse or operator.

The anaesthetic of choice is intratracheal, as it permits the anaesthetist to be some distance away from the field of operation after the patient is well induced. To accomplish this, a catheter is passed between the vocal cords and attached to an electrical machine which delivers the ether into the trachea at a given rate. As a rule this operation requires two to three hours.

The splints are kept on for three months, and the patient is fed liquids, semi-solids and even mashed potatoes, minced meat and vegetables. These patients do not lose weight, but are not working.

It is advisable each month to have Roentgen Rays made to observe the progress of bony repair.

# Clasps\*

J. STANLEY BAGNALL, D.D.S.

DENTAL DEPT., DALHOUSIE UNIVERSITY, HALIFAX, N. S.

IT is of more than passing interest that there was in use by the ancient Etruscans, before the founding of Rome in 753 B.C., an appliance for the retention of teeth which was not materially different from the ferrule clasp of today. In all the long history of the use of the clasp in prosthetic dentistry, there probably has been no time when more interest was taken in its use than there is now. There are a variety of reasons for this. First there is the increasing interest of the profession in restorations, and more particularly removable restorations. It may be doubted, though, whether the need for these has arisen as a result of the activities of Punch's absent-minded dentist, who murmurs as he pulls them out, "She loves me, she loves me not." Then, too, there is the increasing interest in the casting technic, not only as regards the casting of clasps, but also of cast restorations on which clasps may be used.

The whole question of the use of clasps has been argued pro and con in our literature, for fifty years or more, and seemingly we are not much nearer a solution now than then. Whether to clasp or not to clasp is a question which should always be carefully decided in each individual case. The operator who states that clasps are dangerous and destroy teeth, and then either extracts the rest of the teeth and makes a full denture, or else mutilates these teeth to provide abutments for fixed bridges, is hardly consistent in his arguments. The end result of the tooth which decays under a clasp, and is then filled, is not worse than the mutilation which is carried out by the operator referred to. The good features of the clasp are so mixed up with its dangerous features that we should proceed slowly. There can be little doubt that the average practitioner pays too little intelligent attention to the dangers of the clasp. The reasons for this are probably not difficult to understand. If the damaging effects which may be caused by the clasp appeared as quickly as the explosion which follows the detonation of the gun cotton, they would be evident to all. But some of these dangers are so insidious, and extend over such a long period, that it frequently happens that the dentist who writes the opening chapters, in a given case, is not the one who writes the concluding chapters. It has been with some attempt to point out the dangers, rather than to stress the advantages, that these remarks have been written.

The profession has lately been passing through an era of great change with regard to its ideas on crown and bridge work. Bridges

\*Read before Halifax Dental Society, March, 1923.

gradually grew in size, till full restorations on four or five teeth were advocated by some operators. Then there was a rude awakening and we discovered, long after we should have, that there is a distinct limit to the strain which can be safely borne by a tooth and its surrounding tissues. Are we not tending the same way with our removable restorations? While it is undoubtedly true that we may obtain a large measure of support from the soft tissues, still a greater or lesser amount of the strain, depending on the skill used in making the restoration, must be borne by the supporting teeth.

*Requirements of a partial denture.* It may be well first to consider briefly what are some of the requirements of a partial denture. Stricker <sup>(1)</sup> in the Dental Summary for August, 1919, has stated, among other requirements, that a partial denture should have:

1. The strength to withstand stress of mastication.
2. It should restore normal occlusion.
3. It should be of simple construction.
4. It should not in any manner impinge on the tissues enveloping the abutment teeth.

Gabell, <sup>(2)</sup> in the proceedings of the Sixth International Congress, lays down some further requirements:

5. That a partial denture should have sufficient permanent support to bear the pressure of mastication.
6. That it should have sufficient retention to keep the denture in position.
7. It should cause as little discomfort as possible.

When we read through this list of requirements we are faced at once with the fact that there are many fundamental facts in partial denture construction that we do not know, and which, as a scientific profession, we should have some knowledge of before we go blindly ahead. True, we have learned a lot in the past few years. Thus, our knowledge of what constitutes normal occlusion has been greatly extended. But it took the writings of such men as Drs. Stillman and McCall to emphasize how slight a departure from normal occlusion can be tolerated in most mouths.

How far are we able to answer the first question in this list of requirements? Namely, what is the necessary strength to withstand the stress of mastication? We may be able to measure quite accurately the biting force of our patient; but given that, have we the necessary data to plan a restoration which will efficiently withstand this stress? It must be rigid enough not to bend markedly under the stress of mastication; and it must be strong enough, with some margin over for safety, to withstand this force, and also not to break during cleansing. If we exceed these requirements we are only needlessly increasing the expense and the strain on the abutments.

Gabell also points out in the Report <sup>(2)</sup> already referred to, some

additional factors which must be borne in mind when planning the retention of partial dentures:

1. Absorption of the outer alveolar plate of the maxilla renders the foundation narrower than the surface receiving the bite, hence a tilting strain is imposed on the denture. This strain is exerted with the full force of the bite, and is not a light one.
2. The mucosa may be tender to pressure. This may be temporary, or result for years as the result of deep seated infection. This may demand an increase in the area of the base, and the use of the teeth, as supports, to relieve the pressure.
3. Shape of the support may be such as to permit sliding or rolling of the denture. The base on which a partial rests is seldom at right angles to the force exerted on it. The tendency for the denture to slide up an inclined plane is so great that it will require a strong support to resist it. May be necessary to narrow the occlusal surfaces of the teeth.
4. Apart from the yielding of the soft tissues, under the pressure of mastication, which should always be allowed for, the bone under the saddle is always liable to undergo further absorption.

The amount of retentive force necessary in a partial restoration, according to Cummer, <sup>(3)</sup> in the Dental Summary, Dec., 1922, must be sufficient to oppose the displacing forces. These are gravity, in the case of the upper, which is very slight and a matter of ounces only; and force of mastication, which, in a correctly constructed denture, tends to seal it more firmly in position. Hence only a slight retentive force is necessary, except in the case of small pieces which may be swallowed, where the retentive force should be positive, requiring some effort to dislodge the piece. Clasps, then, in some form or other, can provide the desired retentive force in the majority of cases.

The dangers which may result from the use of clasps are greatly aggravated by faulty technic, and fall under two main divisions: 1. Injuries to the abutment tooth grasped by the clasp, and 2. Injuries to the investing and supporting tissues of this tooth.

The statement that clasps can injure teeth by attrition has been questioned, but it would seem that this danger is present in at least a slight degree. We know that while the effect of wear is much more rapid on the soft substance, there is also an effect on the hard one. This would appear to be so slight as not to constitute a serious drawback to the use of clasps; unless for some reason, such as the use of unscientific tooth pastes, hard gritty particles are held in contact with the tooth structure by the clasps, and cut against the tooth with every movement. It should not be forgotten that there is a definite limit to the hardness of the alloy which should be used in those clasps which "slip" on the tooth. If one is to judge from the experience of the periodontists with inlays on the occlusal surfaces, the alloy should not be harder than 22k. gold.

The second danger to tooth structure from clasps is a much more serious one, and requires greater effort to avoid. We know that when a liquid is placed in a fine tube, the liquid is drawn upward by capillary attraction. The saliva, with its contained particles of food, is in the same manner held in the angle formed by tooth and clasp and is also drawn in between clasp and tooth. No matter what our present theory with regard to the roles various factors play in the incidence and progress of dental caries, one fact at least seems certain: that is, that fermenting food material remaining in contact with the tooth is very likely to lead to caries. Clasps may therefore be a source of real danger, in that they not only attract and hold in position this film of fermenting material, but they protect this film from the cleansing action of fibrous foods, tongue, saliva, etc. It follows, then, that the greater the area of the clasp, the greater is the area of the tooth structure exposed to the action of caries. Further, this danger would appear to be always present in any clasp which is sufficiently well adapted to the tooth to be of service in retention, since no clasp can fit the tooth so closely as to prevent the entry of at least a thin film of saliva; nor, on the other hand, be too far away from the tooth to prevent this force from working. But it is probable that the closely fitting clasp is less dangerous from this standpoint than the poorly fitting one, since the amount of fermenting material is so much smaller, and the consequent acid production less. The tight fitting clasp which grips the tooth closely without movement, would, on the other hand, appear to be dangerous, since the film is not broken up by any movement of the clasp, but is held in protected contact on the tooth.

We would be led to believe, from clinical experience, that the portion of the tooth that is found most frequently decayed, as the result of clasp action, is the neck of the tooth. Where a clasp is constructed so that it grasps the tooth around the neck; and the gingival border of the clasp is in contact with, or almost in contact with, the free margin of the gingiva, then we have an additional three sided area exposed to caries action from fermenting material. Further, the saliva which lodges around the neck of the tooth contains a greater quantity of suspended food material, and is thus a source of greater potential danger than that which moistens other parts of the tooth. The enamel coating is also thinner here. If these facts be granted, our ideal clasp should have a small close fitting contact with the tooth, and not grasp the tooth so closely as to prevent movement. Also that it should not be in contact with the free gingival margin, but have both edges exposed to the various cleansing agents of the mouth.

*Injuries to the Soft and Hard Tissues surrounding the teeth*, which result from faulty clasp technic, fall under a number of heads:

1. Injury to the free margin of the gingiva. This may result from the settling of the clasp, especially where it has been originally placed too close to the gingival border. Or it may be the result of the con-

stant irritation of a clasp which is in contact with the gingiva. This irritation is followed by increased blood supply to the part, and the tissues pass through the various stages of arterial hyperemia, venous hyperemia and suppuration. The process is aided and increased by the presence of fermenting and decomposing food material. The periodontal membrane is destroyed, the crest of the alveolar process to which it is attached is absorbed, and the end result is likely to be pocket formation. It has long been an axiom of both operative dentistry and crown and bridge work, that there must not be any overhanging margins to compress the gingiva. Is there any less danger when these overhanging margins are clasps?

*Injuries to the pericementum* are usually the result of excessive stress on the clasps, which is transmitted through the abutments to the supporting tissues of the tooth. This may result from a variety of causes, as: (a) A restoration so planned that it does not tend to resist the stresses upon it in mastication. Thus that type of restoration that has a large lingual flange, but no buccal extension. Then, during the excursions of the mandible, the tendency is to force the restoration up the incline and away from the supporting teeth. (b) Setting up teeth outside the ridge, thus increasing the work arm of the lever and requiring a greater retentive force to counteract it. (c) Where the case is set up on the plain line articulator, conditions present in the mouth are not duplicated, and unless special care is taken to grind the case into articulation, when it is inserted, there will be interlocking of the opposing cusps. (d) That type of restoration where the retainers are not placed in the fulcrum line. Thus, in that condition of the maxilla where all the teeth on each side posterior to the bicuspid are lost. If the retention here is by clasps on the bicuspid only, then the case tends to fall away from the rear, while held in position in front by the clasps. There is a resulting rotating force transmitted to the bicuspid.

The dangers in these four types of cases vary with the kind of clasp used. The danger of injury is least in that type which does not grip the tooth very closely, but is capable of slip, and is greatest in that which fits the tooth rigidly.

*Occlusal Rests.* Bonwill first advocated the carrying of a spur from the clasp on to the occlusal surface of the tooth. This occlusal rest should be made of some rigid material as iridio-platinum wire, or clasp metal reinforced by solder. This prevents the clasp settling towards the gingiva. Then if the clasp and saddle are rigidly connected, and the tissue under the saddle undergoes further absorption, the saddle loses its support, and instead of the restoration being supported by the teeth and soft tissues acting in conjunction, it is supported by the teeth alone. This might not be so serious in a small case, as the condition then is not relatively different to that found in a small fixed bridge. But it may result in a serious strain on the abutments in the case of large restorations. The same condition results where

the mucosa is soft and allows of a certain amount of movement of the saddle, while the clasps are prevented, by the occlusal rests, from moving in the same direction.

If, on the other hand, the pressure is so adjusted, during assembly of the parts, that the soft tissues under the saddle are forced to carry more than their share of the load, compression of the tissues results, followed by interference with the circulation, and pressure atrophy. The tissues shrink away from the saddle, and the end result will again be overstrain of the abutment teeth.

It should follow from these remarks that occlusal rests on clasps should be used with great caution. With properly constructed and placed clasps, occlusal rests are seldom indicated. The reasons assigned for their use are threefold:

1. Prevent settling of the clasp, and its impingement on the gingiva.
2. To distribute force of occlusion between mucosa and abutment teeth.
3. Prevent loss of contact of the teeth.

Since the greatest contour of the tooth most suitable for clasping is usually one-half to two-thirds the distance from gingiva to occlusal surface, a restoration should not settle sufficiently to allow the clasp to come into contact with the gingiva. The chief exception to this general statement is the restoration which is placed on fresh gums. In this class of cases we must allow for the absorption of the alveolus; but as the extent of this cannot be estimated with any great degree of accuracy, it would appear that the sanest method for treating these cases would be to rebase the case as required, till absorption is complete.

It would seem impossible to have the abutment teeth and the mucosa under the saddle always bear an equal share of the thrust of occlusion if the saddles and retainers are linked rigidly together. When the restoration is assembled the saddle should be so adjusted that it will rest in light contact with the mucosa. Then under the force of occlusion the saddle tends to compress the mucosa and move away from the pressure of the opposing teeth and carry the clasps with it, but the clasps are prevented from moving by the occlusal rests. Where the alveolus is only covered by a thin tense tissue this movement is very slight and need not be considered. But where the mucosa is compressible, the clasps and saddle should be connected with some approved type of flexible connector.

Within the past few years we have had various types of flexible connectors introduced. They are only required where there is the possibility of independent movement between the saddle and clasps. This only occurs with rigid clasps that do not slip, or where occlusal rests are used. Flexible connectors will allow of a certain amount of independent movement, thus avoiding strain on the abutment teeth. There are several good makes on the market. These are of two types,

(3) simple and compound. An example of the former is the flexible wire connector between clasps and bar, made by the Williams Company; and an ingenious example of the latter is the link arrangement introduced by Dresch.

Still another source of danger occurs in connection with the assembly of metal restorations. If the clasps are joined to the saddle with large masses of solder, warpage will occur, and the clasps assume a different position than the intended one.

A phase of the use of clasps which is seldom given sufficient attention is the correct placing of the clasps. The usual method is to make a rapid survey of the case, pick out two or three teeth with marked contours and decide to clasp them. But, it should always be remembered that the careless selection of the abutment teeth may result in unnecessary strains. Study models should be made if the case is one of more than ordinary difficulty. Cummer (3) in his article in the Summary for December has given a number of rules for the correct location of retainers: 1. Select pairs of natural teeth which are adjacent to the edentulous space, and so situated that a straight line joining them will pass through the centre of gravity of the piece. 2. If this is not expedient select pairs of natural teeth adjacent to the edentulous space and so placed that a straight line joining them will pass across the centre of the entire arch. Indirect retainers are added to bring fulcrum line back to the centre of the piece. 3. If this is inexpedient, select pairs of teeth on one side which may afford retention, either with or without auxiliary retention. 4. Failing these, select three, or if necessary, four, teeth which are in a semi-quadrilateral or semi-triangular relationship.

Our first choice (3) is the most favorably paired group, or if this is not possible, the triplicate or quadruplicate group which are most suitable for clasping, i.e.:

- (a) Teeth with decided opposing convexities.
- (b) Teeth of good pericemental and enamel condition.
- (c) Teeth which are free from caries, erosion, abrasion, large fillings, inlays, etc.
- (d) Teeth which are as remote as possible from the anterior of the mouth.

The action (2) of the clasps is:

1. By the contact between the clasp and tooth giving sufficient friction to prevent sliding up or down on the tooth.
2. By the slight undercut of the tooth being gripped by the springiness of the metal.
3. By direct resistance of the metal to movement in any direction.

We come next to the general requirements of clasps: (2 & 3)

1. Bonwill's rule is that a clasp, for purposes of retention, should encircle at least two sides and three angles of a tooth. It should so augment the other retaining forces that the restoration

cannot be displaced during mastication, while at the same time permitting it to be easily removed by the patient.

2. Should touch enamel only, and preferably that portion of the sides where the enamel is thickest, i.e., the height of contour.
3. Where the restoration is such that there may be slight movement of the saddle independent of the clasp, and rigid connectors are used, the clasp should be sufficiently resilient to allow of slight movement up and down and around the anchor tooth.
4. It should taper evenly in bulk from the body to the extremities, so that it will have the maximum of strength and elasticity.
5. Must have sufficient strength to withstand the stress of mastication and of vigorous cleansing.
6. Must fit closely and with no part of the clasp standing free from the tooth, thus increasing the danger of food retention.
7. Must be brightly polished and with the edges bevelled.
8. Must grasp the tooth evenly on both sides, without pushing or pulling on it. If the tooth is grasped on the buccal only, the unopposed spring pressure applied to one side will soon cause the tooth to become tender to pressure.
9. Clasp should grasp the most bulbous part of the tooth, and extend an equal slight distance above and below the greatest diameter. This gives the greatest retention with the least strain to the metal. Clasps which extend much below the greatest diameter of the tooth are difficult to insert. If the clasp is placed to the occlusal of the greatest diameter, the elasticity of the clasp tends to force the restoration out of contact with the mucosa. Conversely, clasps placed to the gingival of this position tend to extrude tooth out of the socket.
10. Where the two sides of the tooth grasped by the free ends of the clasp are not parallel in their mesio-distal plane, the body of the clasp should be placed across the broadest end. Otherwise the elasticity of clasp will tend to force it off the tooth.
11. Clasps should be so attached to the saddle as to prevent impingement of the gingiva, at the point of attachment, and permit of free circulation of the saliva.
12. Where more than one clasp is used, they should be so designed and located as to act in conjunction with one another. Two or more teeth may be fitted with splendid individual clasps, but when the piece is assembled, it may either be impossible to insert it, or undue strain may be placed on the abutment teeth. Theoretically there should be no strain on the abutment teeth when the restoration is in position.
13. Should be so placed as to be as little visible as possible.
14. Should not be used on teeth with lingual or buccal lean, if rigid connectors are used, because of the tendency to force these teeth still further out of position.

15. The use of a clasp between two slightly separated teeth should rarely be undertaken, and never if interference with the interproximal space will result.
16. The lone bicuspid, molar or cuspid tooth (in this order of preference) at the end of a series, is, other factors being equal, the most suitable tooth for clasping, because of its shape.
17. Platinum alloyed clasp metal is generally considered the most suitable, and retains its temper well after soldering.

A well made set of clasps should cause the denture to slide into place with a smooth motion, except that at the last moment it slips up a little easier than in the middle position. The clasp that goes up with a click and a jar is to be distrusted for the accuracy of its fit and durability.

There are available for our use at the present time, a large number of varieties of clasps, which, however, all fall under three main divisions.<sup>(3)</sup> These are, cast, wrought and composite clasps.

Composite clasps are partly wrought and partly cast. This type of clasp has had a rather limited range of application up to the present time. Its chief use has been as a disto-lingual-mesial clasp on anteriors and bicuspid. Two hooks of 17 to 18 gauge elastic wire are bent to required shape, and united by a cast portion across the lingual. This type of clasp would seem to have a rather wider range of application than has yet been made of it.

Cast clasps are the type which are probably causing the most interest at the present time. The original technic for their construction, introduced by Nesbitt, called for amalgam models of the abutment teeth; while in the later technic introduced by Roach the investment model is secured directly from the impression. This has the advantage of less danger of distortion of the wax model of the clasp. But, on the other hand, the Nesbitt technic gives an accurate model on which the finished clasp may be fitted to the case.

The cast clasp is so recent an acquisition that one hesitates to express an opinion as to its permanent worth. We have seen already that it possesses possibilities of great damage because of its rigid grasp on the tooth. Yet the present tendency to have the clasp cover less area of the tooth than was originally advocated is a step in the right direction, as is also the use of flexible connectors, when they are indicated. The material used is quite hard, and care must be taken to have not only the exposed surface, but also the surface in contact with the tooth, smooth and polished.

The extension of the clasp, which has lately been advocated, so that it encircles a larger portion of the tooth, while it undoubtedly increases the mechanical features of the clasp, does so at rather grave risk.

The molecules of cast clasps are not stretched out as in the wrought plate or wire, but remain short; hence greater bulk is required for the

same amount of strength. This also prevents any bending of the clasp, when once it has been cast.

The success of the clasp<sup>(4)</sup> depends on the metal used. Platinum is used to give rigidity to the gold. It is preferable to nickel, which, if used, should not exceed 5%. Too much platinum or palladium is also harmful, resulting in a brittle, easily broken clasp. The best material seems to be one with not more than 16% platinum and palladium. Gold color metal is contraindicated in teeth with large bell-shaped crowns, but can be used to advantage where the teeth are fairly straight sided.

Whatever metal is used, care should be taken to keep it in balance during the casting. Most high fusing alloys contain copper, and if this is melted out, the clasp becomes brittle, because of the increased ratio of platinum.

The spring or resiliency of a clasp is often lost when it is cleaned, or when the tail or lug is soldered to it. Metal, such as is used for cast clasps, and having a high platinum content, is annealed by heating to a cherry red, then quickly immersing in sulphuric acid. Sudden chilling in water will also anneal it. On the other hand, it is hardened if it is heated to cherry red and allowed to cool slowly.

The cast clasp has been advocated<sup>(5)</sup> in those restorations where the span is short and suitable teeth are placed at each end of the space. In these cases a good positive grip is required. It is also useful in those short teeth where we cannot get sufficient width to obtain the necessary bulk of metal, for elasticity, without impinging on the gingiva if short wrought clasps are used.

The policy of making a slight carefully polished mesio distal groove on the anterior teeth, which have little or no contour, would appear preferable to either placing the clasp close to or under the gingiva, or to the use of some compound attachment as the Roach, which requires marked mutilation of the tooth.

The present tendency of some workers to cast clasps and saddles in one piece would seem to be dangerous, since we cannot entirely control shrinkage in large masses of metal. Besides there is the difficulty of getting an even adjustment of the pressure between the mucosa and abutment teeth.

Wrought clasps have long been the standard of the profession, and for the majority of cases some type of wrought clasp would seem to most nearly meet those requirements we have laid down as essential in our ideal clasp. Any type of wrought clasp should be made of an alloy which is capable of being annealed without loss of elasticity. If we attempt to bend a rigid piece of clasp metal, it is impossible to get the sharp turns required without danger of overstraining the cohesion of the molecules and making a weak spot in the clasp.

The practice of making up clasps on the same cast as that used for setting up the teeth cannot be too strongly criticised. These casts

are poured in plaster or stone, neither of which is hard enough for the fitting of clasps. Teeth which are to be clasped demand an accurate impression, which will reproduce all the contours. This should be taken either in plaster of Paris, or in one of the newer impression materials such as complaster. The cast is then poured in Melotte's metal. The clasp should be fitted on the teeth in the mouth before the case is assembled.

Then in packing the case with rubber care must be taken that the clasp is not moved, during vulcanizing, out of its correct position. The simplest way to avoid this is to bend the distal end of the tang downwards till it touches the cast, and thus support the clasp in position.

The most common type of wrought clasp is the band, or matrix clasp. This type of clasp, as it is usually made, should have a much more limited range of application than it has. If the tooth has a slight amount of contour it is possible for the skilled mechanic to get a good adaptation with suitable pliers. But where the tooth has a marked contour, it is not possible to get accurate adaptation by the ordinary methods with pliers. This type of tooth requires that the inner surface of the clasp be concaved, while the long diameter of the clasp is at the same time bent to follow the curvature of the tooth. The result is that the edges of the clasp are not likely to have that close adaptation to the tooth which is essential.

Where band clasps are used on this type of tooth it would seem more efficient to make the clasp in two pieces. A thin matrix of 36 g. pure gold or platinum is first adapted to the tooth. Then a good grade of elastic gold is adapted with the pliers to fit as closely over this as possible. The two are then soldered together. The closer the adaptation of the outer clasp to the inner, the less danger there will be from shrinkage and distortion.

A technic of this nature does not appeal if we can use some other type of wrought clasp which will do the work as efficiently. And it is felt that this can be done with the round elastic gold alloy clasp wire of 17-19 gauge. This is used either double or single. In the former we have a double loop of the wire, one strand passing below the highest point of contour, and the other just above it. This clasp may be bent to include an occlusal rest or not, as indicated.

The second class of wire clasps consist of a single strand. There are several well known examples, as the Roach Loop, Balkwill Tee, and Double Balkwill Tee or Jackson Crib, etc.

It must be admitted that all of these types require considerable skill in the bending of wire. But inasmuch as they have only a very narrow point of contact with the tooth, a good clasp is more easily made than where the band clasp material is used. This type of clasp fulfils our suggested requirements of a general purpose clasp. That is, it has small bulk, fits the tooth surface closely, and admits

of a certain amount of "slip" on the tooth. While no one type of clasp or of clasp material will suit all types of cases, it is felt that the wire clasp of suitable size, and well made, from good material, is capable of very general application in scientific dentistry.

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## Lecture Notes on Dental Pathology

*The subject-matter in the following notes was given during session 1922-3 as a series of lectures to the Fifth Year students of the Royal College of Dental Surgeons, by Dr. Robert M. Box, and is based on the Researches of the Professor in the subject, Dr. Harold K. Box.*

### HISTOLOGY OF THE GINGIVAE

THE Histology of the Periodontal tissues in its salient points is a matter of common knowledge to the dental profession. It will be advantageous in studying periodontal diseases to review briefly the minute anatomy of these tissues which are chiefly involved.

The periodontal tissues consist of the gingivae, pericementum and the alveolar process.

The gingivae include all the soft tissues which invest the cervical portions of the crowns and roots of the teeth, to the level of the crests of the alveolar process.

That portion of the gingival tissue which lies in contact with the enamel but is not directly attached to the tooth, is called the marginal gingivae. This name is applied both to the labial, lingual and proximate portions of the teeth. Having its insertion in the cementum and extending towards the crest of the marginal gingiva, is found the first group of principal fibres. The function of this group is to hold the marginal gingivae in close apposition to the enamel surface.

The main bulk of the gingival tissues rests upon the crests of the alveolar process and is supported by them. From these crests to the gingival line, the amelo-cemental junction, and attached to the cementum, is that division of these tissues known as the cemental gingivae. The cemental gingivae are attached to the alveolar crests by fibres of the periosteum and certain principal fibres which are inserted into the cementum.

Passing mesio-distally from tooth to tooth through the cemental gingivae, is the second or trans-septal group of principal fibres. It helps to hold the contact points of the teeth together.

Rising from the cemental gingivae and supported by them are wedge-shaped tissue extension which encircle the enamel at the cervix. By their contact with the enamel they form the so-called gingival crevice, the deepest portion of which is bounded by the first attachment of the cemental gingivae at the amelo-cemental junction.

The epithelium which covers the gingivae is the stratified squamous type. It differs from that of the alveolar mucosa in that it is thicker and exhibits a deep invagination by finger-like papillae which extend into it from the underlying connective tissue. The epithelium of the crevicular surface is thinner than that of the external surface of the marginal gingiva but exhibits a somewhat similar invagination.

Each connective tissue papilla carries an arteriole and a venule which are joined by a capillary loop at their extremity. This circulatory apparatus is designed to carry nourishment to the epithelial cells. The extremities of these papillae lie very near the external surface of this tissue, hence while the epithelium as a whole has considerable thickness, the protection from bacterial attack, which it affords, is measured only by the number of cells which intervenes between the extremity of the connective tissue papillae and the surface of the epithelium. Acute infections and abrasions may therefore quite readily open a channel for infection into the blood stream.

The blood supply of the marginal and cemental gingivae is derived from the pericemental, and periosteal blood vessels, and from the soft tissues resting upon the alveolar process. It is important to keep in mind that part of this blood supply is derived from the pericementum.

This fact explains the phenomena of gingival congestion so frequently seen in cases of traumatic occlusion, in which other elements of gingival irritation are absent.

The epithelium of the crevicular surface is normally attached to the cementum at its junction with the enamel. Occasionally this junction is imperfect and breaks are also observed in the epithelium of the crevicular surface. The significance of these faults, lies in the fact that where they occur the connective tissue and blood vessels are exposed to the contents of the gingival crevice. Bacterial invasion and infection of the submucous tissues may, in such places, easily take place.

## HISTOLOGY OF THE PERICEMENTUM

The pericementum is the tissue that fills the space between the root of the tooth and the wall of the alveolus. It attaches the teeth to the alveolar process. In the study of the histological structures which constitute this important tissue this order will be followed :

- |                      |                           |
|----------------------|---------------------------|
| 1. Principal fibres. | 5. Osteoclasts.           |
| 2. Fibroblasts.      | 6. Epithelial Structures. |
| 3. Cementoblasts.    | 7. Blood vessels.         |
| 4. Osteoblasts.      | 8. Nerves.                |

### 1.—PRINCIPAL FIBRES

These fibres, which compose the greater part of the pericementum, are of the white connective tissue variety and are attached to the cementum on one side and on the other extremity depending on the location, to the connective tissues in the marginal gingiva, the fibrous mat of the alveolar mucosa, the periosteum of the alveolar process, the cementum of the approximating tooth, or bone of the alveolar process. While these fibres as a whole, maintain a uniform progression from the crest of the progress to the cemental apex, yet they exhibit a fairly definite tendency to become associated into groups. These fibre groupings have been well described by Black. Beginning at the crest of the alveolar process and progressing apically, these groupings are as follows : The alveolar crest group, consisting of those fibres which pass over to and are inserted into the crest of the alveolar process.

2. The horizontal group, consisting of those fibres which pass out at right angles to the long axis of the tooth and are attached to the alveolar process a little below its crest.

3. The oblique group consisting of those fibres which pass from the cementum in an oblique direction occlusally, and are attached to the alveolar process. The fibres constitute the body of the pericementum and cover the main body of the root of the tooth.

4. The apical group consisting of those fibres which are attached about the apex of the tooth and extend in bundles to the surrounding alveolar process.

### 2.—FIBROBLASTS.

Found everywhere mixed among the principal fibres, there are connective tissue cells whose cytoplasm is extended into processes, which, as a general rule, run in a direction parallel with the root. The cells are stellate or spindle-shaped and their fibres act as supporting structures to the arteries, veins and nerves.

### 3.—CEMENTOBLASTS.

These cells are really specialized osteoblasts and lie upon the cementum of the root. Their function is to form cementum in the same manner as osteoblasts form bone. Noyes states "They are always flattened cells, sometimes almost scale-like and when seen from above, very irregular in outline. This irregularity in outline is due to the projections of the cytoplasm around the fibres as they spring from the cementum, the edges of the cell being notched and scalloped to fit about them. There is a central mass of granular cytoplasm which contains an oval and more or less flattened nucleus, from which the cytoplasm extends in projection, passing partly around the fibres." Certain cementoblasts here and there become enclosed in the forming matrix as cement corpuscles, lying in stellate lacunae.

### 4.—OSTEOBLASTS.

The osteoblasts of the pericementum are not different from osteoblasts in any other part of the body. They are present upon the bone on the inner side of alveolar process between the principal fibres of the pericementum which are attached to it.

### 5.—OSTEOCLASTS.

The osteoclasts of the pericementum are found occasionally upon the surface of the alveolar wall and the cementum. They do not differ from the osteoclasts of the bone, and are really foreign-body giant cells, formed by the fusion of endothelial leukocytes, and also probably osteoblasts. They are large multinuclear cells and the cytoplasm lies in contact with the surface on which it acts.

### 6.—EPITHELIAL STRUCTURES.

Lying close to the cementum but not in actual contact with it, are structures made up of epithelial cells in the form of strings or loops. The epithelium on the surface projects down into the connective tissue stroma and a short distance from where they end, these cords of epithelial cells appear, and in many instances pass around the entire root portion.

### 7.—BLOOD VESSELS.

The pericementum has an abundant blood supply. The vessels enter the periapical tissues, where they branch and pass into the pericemental tissue, running parallel with the long axis of the root. Some of the branches pass through the apical foramen to nourish the pulp. Sometimes as many as eight or ten branches enter the body of the pericementum and passing occlusally, they give off branches and anastomose with other vessels through the Haversian canals in the process. At the crest of the alveolar process anastomosis occurs with the vessels of gingivae and periosteum.

### 8.—NERVES.

The nerves of the pericementum follow the course of the blood-vessels. Ten to twenty-five medullated fibres enter the periapical tissues with the blood-vessels, some entering the pulp, others passing upward through the bone and form with the others a plexus from which filaments are given off. These terminate in free endings in the pericementum.

## GINGIVITIS

Gingivitis may be defined as the re-active phenomena of the gingival tissues to any injury done to them.

Anything that is capable of injuring the gingival tissues may produce in them this phenomena of inflammation. The essential thing about the harmful agent always is that it injures the tissues, as inflammation takes place because tissue has been injured. The re-action of the tissues to any injurious agent and to the injury produced by it, differs according to the severity of the injury and to the nature of the agent. The function of that re-action is to eliminate the noxious agent, to counteract its action and to repair the injury produced.

Mallory states : " The re-action may be evidenced chemically, by metabolic changes, such as alterations of secretions and excretions ; morphologically, by the presence of serum, fibrin and leukocytes and by the proliferation of cells ; and physiologically by alteration of functional activity." Again he states : " The morphologic changes which take place as a result of this action of various injurious agents vary greatly, depending on the strength and character of the latter : " also, " In general we may divide the injurious agents into two groups, the strong and the mild irritants (with all gradations between) although it is difficult to confine some of them exclusively to either group."

Due to the epoch-making discoveries of Virchow, Cohnheim, Marchand, and others, our conception of the changes which take place in the tissues as a resultant of the action of strong injurious agents has been clarified, and it has been generally acknowledged that acute inflammation is anatomically manifested both macroscopically and microscopically by three main processes. Mallory has described them as follows :

(1) Circulatory disturbances.

(2) Inflammatory exudation.

(a) Exudation of lymph (including formation of fibrin).

(b) Emigration of leukocytes (chiefly of the polymorphonuclear leukocytes.)

(3) Proliferation of emigrated endothelial leukocytes and lymphocytes, of fibroblasts, of vascular endothelium and of epithelial cells, if included in the lesion."

A detailed description of the phenomena of acute inflammation having been presented to you by another department, will not be necessary here. As these changes induce certain gross anatomical appearances which as a rule can be distinguished clinically, and are known as the classic signs of acute inflammation, namely, redness, heat, swelling and pain, it is advised that students of periodontal pathology should study these phenomena through the medium of a standard text-book of general pathology.

The re-action of the tissues to mild injurious agents, from a histo-pathological point of view, is of equal importance to the re-action to strong irritants, manifested in acute inflammation. Its significance in dental pathology has not been fully appreciated. As the mild injurious agents include micro-organisms which produce weak toxins and also strong toxins from various sources, which have been so diluted as to act as mild irritants, from the standpoint of focal infection, the greatest problem in the dental profession to-day, the inflammatory re-action to these mild irritants is of much greater moment than the re-action to strong injurious agents.

The lack of appreciation, pathologically, of the relation of these reactions to those produced by the strong irritants, and the fact that when an injurious agent acts mildly, one or all of the classic signs of acute inflammation may be lacking, with the consequent difficulty in clinical diagnosis, account largely for the obscurity surrounding the subject.

According to Mallory, "The most common inflammatory reaction to mild irritants consists of an exudation and proliferation of endothelial leukocytes which sometimes accumulate in very large numbers. To the endothelial leukocytes may be added serum (from which fibrin may form), lymphocytes, polymorphonuclear leukocytes and rarely eosinophiles."

"Other injurious agents attract lymphocytes in large numbers so that focal accumulations of some size may occur in various organs and tissues; for instance in the heart, kidney, adrenal and skin."

The gingivae are frequently the site of inflammatory processes, which often persist over a considerable period of time. These manifestations of the defensive processes of the gingival tissues are revealed only to the competent observer, his ability to interpret them depending upon his understanding of the fundamental principles of inflammation and of the histology of the tissues involved. The phenomena of acute inflammation are displayed in the gingival tissues as variegated clinical pictures, but the inflammatory reactions to mild injurious agents are generally unapparent and are detected with difficulty.

It must be kept in mind that bacterial invasion of the gingivae rarely takes place without a pre-existing state of local lowered resistance. Careful investigations have proved that, from a bacteriological standpoint, the causative factors are common to all mouths. All factors in the disturbance of capillary circulation can be regarded as productive of lowered resistance. Unsanitary concretions, restorative impingement, food impaction, incorrect mouth toilet, etc., in this relation are so well known as to need no further comment.

During the period in which the alveolar crest is under great strain in its effort to maintain a balance of the forces acting against it, and for the period immediately following disturbance of that balance, in many instances the marginal gingivae present clinically a characteristic hyperemia which is regarded as a sign of pericemental trauma. Upon establishment of equilibrium of the forces by readjustment of factors that to a considerable degree are under the control of the operator, namely, the point of application and the direction of the initial force, these tissues as a rule quickly regain their normal tone and color. When the tooth is pushed against the alveolar crest and associated alveolar wall, an abnormal condensation of pericemental tissue lying between the tooth and these areas, takes place. Dependent upon the intensity of this condensation, the blood-vessels are more or less constricted and the flow of blood through them is partly cut off. When the pressure is removed, there is a consequent dilatation of the blood-vessels. This condition is reflected in the terminal capillary loops in the marginal gingivae, a clinically observable disturbance.

Inflammation of the gingivae may be classified as follows:

1. Marginal gingivae. (a) Acute: { Non-ulcerative.  
Ulcerative (fuso-spirillary).  
(b) Sub-acute.  
(c) Chronic: { Non-ulcerative.  
Hyperplastic.  
Ulcerative: { Fuso-spirillary.  
Crevicular.  
Calicular.
2. Cemental gingivae. (a) Acute: { Non-ulcerative.  
Ulcerative (fuso-spirillary).  
(b) Sub-acute.  
(c) Chronic suppurative: { Non-ulcerative.  
Ulcerative.

## 1.—MARGINAL GINGIVAE.

## (1) Acute Fusio-Spirillary Gingivitis.

Regarding this form of gingival disease, Stillman and McCall have stated: "The chief characteristics are: Sudden onset, a sensitive and serpiginous ulcer consisting of necrotic tissue elements and a creamy, pasty, exudate; characteristic fetor of the breath, hemorrhages, either spontaneous or induced by touch, a neurosis exhibiting malaise, mental depression, insomnia, restlessness, loss of appetite, profuse flow of saliva, often with a metallic taste, temperature above normal."

Upon microscopic examination of slides made from sections taken from gingivae infected with this form of gingivitis, most of the epithelial cells have been cast off and many of those present are swollen and filled with drops of exudate which crowd the nuclei against the cell body. This exudation consists of serum and leukocytes; fibrin has been deposited as a layer of interlaced fibrils and mesh-works matted together, entangling leukocytes and bacteria. Red blood cells have escaped from the blood-vessels and are found free in the surrounding mesh-work.

## CHRONIC NON-ULCERATIVE.

From a microscopic examination of marginal gingivae showing long standing inflammatory reaction, the following has been noted. There is a large infiltration of leukocytes in the connective tissue stroma beneath the surface epithelium of the marginal gingivae. These cells lie between the bundles of fibres and in some instances are present in the papillae. The blood-vessels are dilated and filled with red blood cells. A very marked feature is the predominance of plasma cells. Lymphocytes and eosinophiles are also present. The main function of the lymphocytes appears to be the neutralization or disposition of injurious substances which are being absorbed through the lymphatics. It is not known just what function the eosinophile has, but it is thought to be the counteraction of a certain injurious chemical substance.

## HYPERPLASTIC.

The mucous membrane appears to be unchanged as a general rule, although in some areas the epithelium seems to project into the underlying tissue somewhat farther than normally. The bulk of the mass is made up of fibrous connective tissue, the bundles of which form traheculae ramifying in all directions. Many of the blood-vessels are dilated. In the tissue spaces around the blood-vessels and between the bundles of connective tissue, the cellular elements are very greatly multiplied.

## CHRONIC ULCERATIVE (CREVICULAR).

The gingival crevice is normally cleansed by a serum which is derived from the marginal and cemental gingivae. When, through growth of micro-organisms on the crevicular enamel surface the crevice becomes foul, especially when facilitated by a holding medium such as etched enamel (that is, removal of the superficial cementing substance from between the enamel rods), necrosis of the crevicular epithelium takes place. By the death of epithelial cells, there is provided a suitable medium for the growth of micro-organisms, and their penetration is facilitated. The resultant pathological condition is ulceration.

## 2.—CEMENTAL GINGIVA.

## (1) Sub-acute.

This type of re-action in the cemental gingiva in no way differs from that occurring in the marginal gingiva. The majority of these lesions are found at the base of the gingival crevice, where, through imperfect junction of the epithelial cells with the cementum, or because of the extreme thinness of this defensive covering, the tissue underlying this area is not adequately protected. Plasma cells and lymphocytes are the predominating leukocytes.

A typical feature of the microscopic picture is the proliferation of the crevicular epithelium downward along the cementum. One or two things as a rule takes place. In the first place, by progression of the inflammatory process, ulceration is established and the proliferating epithelium is included in the loss of tissue. In the second instance, the epithelium, by proliferation, extends for some distance along the cemental surface. Then separation from the cementum takes place with the resultant denudation of the cementum and the formation of a pocket. Infection of the tissue at the base of this pocket generally occurs, sooner or later, with the consequent establishment of ulceration.

## CHRONIC SUPPURATIVE (NON-ULCERATIVE).

This type of inflammation in the cemental gingivae again resembles that occurring in the marginal gingivae and described previously. The leukocytic infiltration, chiefly plasma cells and lymphocytes, is present between the bundles of fibres and occasionally in the papillae. A suppurative gingivitis frequently follows this type, due to acute inflammatory changes in which the exudate passes through the epithelial covering to the pocket. A characteristic of this suppurative but non-ulcerative condition is the fact that the epithelium covering the denuded soft tissues remains intact. The epithelial cells are not lost until actual ulceration takes place.

## CHRONIC SUPPURATIVE (ULCERATIVE).

The presence of ulceration in the cemental gingivae at the base of the gingival crevice, with its resultant denudation of the cementum, constitutes one of the most important types of gingivitis presenting itself to the dental profession to-day. After ulceration is established, a continuation of the process leads to the formation of a pus-pocket in the cemental gingiva, a lesion which can be diagnosed clinically. As Chronic Suppurative Gingivitis, Cemental, is the first lesion in one type of Chronic Suppurative Periodontitis, Simplex, and the second lesion in Chronic Suppurative Periodontitis, Complex, two pathological composites to be discussed later, and as it may persist for years with little progression as a chronic gingivitis, its importance can not be over-emphasized.

## PERIODONTITIS

This term, periodontium, is used to designate the supporting tissues of the teeth. The three essential tissue-components of the periodontium are, the gingivae, the pericementum, and the alveolar process. By the term periodontitis, is denoted an inflammation of the periodontium and necessarily involves its three components. On this basis the term makes for simplification and accuracy in terminology. It excludes certain lesions of the periapical tissues such as abscesses and granulomata, because, while the pericementum and alveolar process are involved in these lesions, the gingivae are not.

Inflammations of the periodontium may be classified as follows :

1. Acute Ulcerative (fuso-spirillary).
2. Chronic Suppurative :
 

Simplex :	{ With pus-pocket. { Without pus-pocket.
Complex :	{ With pus-pocket. { Without pus-pocket.

From pathological and clinical viewpoints, Chronic Suppurative Periodontitis of the pus-pocket types may be divided, as seen in the foregoing classification, into two main divisions, first, the Simplex, and second, the Complex. In both types, however, it is a pathological composite, the resultant of certain preceding phases and of which it is constituted.

Treating these phases as pathological entities the names and order in which they occur in the Simplex types are as follows :

1. Chronic Suppurative Gingivitis, Cemental (pus-pocket in cemental gingivae).
2. Chronic Suppurative Pericementitis (pus-pocket extension into the pericementum.)
3. Rarefying Osteitis Infective (with or without condensing Osteitis.)

The names and order of occurrence in the Complex type are as follows :

1. Rarefaction of the alveolar process.
  - (a) Rarefying osteitis non-infective.
  - (b) Atrophy.
2. Chronic Suppurative Gingivitis (pus-pocket in cemental gingivae).
3. Chronic Suppurative Pericementitis (pus-pocket extension into pericementum.)
4. Rarefying Osteitis Infective (with or without condensing osteitis.)

These phases must not be looked upon as stages in the development of Chronic Suppurative Periodontitis phenomena, but rather as distinct, individual, pathological phenomena, which by their fusion in a certain order, have produced this final disease picture.

From an evolutionary standpoint these phases are found in the following order in the development of Chronic Suppurative Periodontitis :

- Simplex : (1) Chronic Suppurative Gingivitis.  
 (2) Chronic Suppurative Gingivitis + Chronic Suppurative Pericementitis.  
 (3) Chronic Suppurative Gingivitis + Chronic Suppurative Pericementitis + Rarefying Osteitis Infective.

- Complex : (1) Rarefaction of the alveolar process.  
 (2) Rarefaction + Chronic Suppurative Gingivitis, Cemental.  
 (3) Rarefaction + Chronic Suppurative Gingivitis, Cemental + Chronic Suppurative Pericementitis.  
 (4) Rarefaction + Chronic Suppurative Gingivitis, Cemental + Chronic Suppurative Pericementitis + Rarefying Osteitis Infective.

The pus-pocket which is represented in Chronic Suppurative Gingivitis, Cemental and Chronic Pericementitis, may be manifested in two entirely different ways, although its pathological sequence, in both the Simplex and Complex forms of Chronic Suppurative Periodontitis, is essentially the same. In the Simplex, the gingival lesion is the dominating one and is not so extensive or rapid in pocket development as in the Complex. It represents a Simple reaction to bacterial invasion whereby, through local lowered resistance in the gingival tissues, infection has been established. Consequent upon the loss of gingival attachment, absorption, of the alveolar crest takes place, again an inflammatory reaction to toxic agents. Where

superficial causes are the dominating ones, in the majority of cases, progress is fairly slow, because of the fact that the pericementum is high in resistance.

In the Complex type of Chronic Suppurative Periodontitis, the formation of the pus-pocket is a phenomenon preceded by much more complicated and deeper changes than a simple gingivitis. The ideal requisites for rapid and deep pocket extension are alveolar resorption, lowered resistance in part or all of the pericementum, and gingivitis. Disturbance of equilibrium as manifested in excessive function or traumatic occlusion, while but one etiological factor in the production of these requisites, especially the changes in the pericementum and alveolar process, is the most important.

## HISTO-PATHOLOGY OF THESE PHASES

### PHASE 1.—RAREFACTION OF THE ALVEOLAR PROCESS.

In stating that the changes in the alveolar process invariably constitute the primary lesion in the types of periodontitis that we choose to term Chronic Suppurative Complex, the researches of Hopewell-Smith, Roy, Gottlieb, Fleishman, Talbot and Box, have met on common ground. The unanimous conclusion of research may be summed up in the words of Hopewell-Smith: "The alveolar bone exhibits even before the gums the most important metamorphoses that have occurred."

The term atrophy has been used to designate this process of rarefaction and its etiology attributed to general systemic disturbances. A conclusion that alveolar resorption as shown by radiographic findings, or in the examination of skulls, in dissection or carefully prepared sections of jaws, in the microscope, is the result of obscure systemic causes, is valueless. Without a complete knowledge of the mechanical functions of the teeth whose supporting structures have been involved, the evidence is incomplete.

That true atrophic conditions of the alveolar process can occur, is not denied. Fine examples can be seen about teeth that have become functionless during natural life; in other words, the enforced rest has brought about a true atrophy. This change is dependent upon defective nutrition, as normal nutrition of the alveolar process depends largely upon normal function of the teeth supported. Senile changes also depend, in part, upon defective nutrition of the tissues owing to the changes in the blood-vessels which occur almost regularly with advanced age.

While insisting upon a most exact consideration of the histo-pathological findings, the clinical observations of prominent periodontists cannot be overlooked. There is clinical evidence in abundance to prove that rarefaction of the alveolar process is almost constantly associated with over-functioning teeth. The splendid work of Stillman and McCall has brought to the attention of the profession, in a way not heretofore shown, the injurious effects of over-function as manifested in traumatic occlusion, upon the periodontal tissues.

For generations, histologists and surgeons have accepted certain views on inflammation and repair of bone. In recent years, however, many of these beliefs have been subjected to exhaustive research, with the result that some of the old conceptions have been rudely shaken. The outstanding scientific investigations of Gallie and Robertson, Toronto, and MacEwen, Edinburgh, on the repair and growth of bone, have led to the formulation of sound opinions, which can be applied with safety to the practice of surgery, both general and periodontal.

The type of rarefaction of the alveolar process most commonly found—that associated with over-functioning teeth, is a simple inflammation, a rarefying osteitis. This rarefying process is effected largely by the action of the embryonic bone cells, the osteoblasts. In adult life, the osteoblasts are found on the surface of the bone only at intervals; in fact, in some cases they are demonstrated with difficulty. Injury to the pericementum and alveolar process, however slight, is followed by a rapid proliferation of the osteoblasts which lie normally on the surface of the alveolar process and in the mouths of its Haversian canals. This is followed by absorption of the bone by the osteoblasts. This absorption takes place on the surface of the alveolar process in the form of irregular concavities or depressions, and also in the open Haversian canals. A characteristic feature of this osteoblastic absorption is the appearance of transverse canals or channels at some distance from the surface of the alveolar process. In these small canals, besides the osteoblasts, small capillaries are usually seen. A minor phase of the rarefying process is the thinning of the bony lamellae by the coalescence of pit-like depressions, Howship's lacunae, which have been formed by the action of multinuclear giant cells, the so-called osteoclasts.

### PHASE 2.—CHRONIC SUPPURATIVE GINGIVITIS, CEMENTAL.

(Pus-pocket in the Cemental Gingivae).

This lesion has been described under Gingivitis.

### PHASE 3.—CHRONIC SUPPURATIVE PERICEMENTITIS.

The pocket formed in the pericementum is a process identical to that formed in the cemental

gingivae. By progression of inflammation there is an active proliferation of the epithelium along the cementum. This epithelium by separation from the cementum leads to the formation of a pocket, bounded on one side by the cementum and on the other by the overlying soft tissue which is in a state of sub-acute or chronic inflammation. Further infection of this tissue takes place as a rule and it presents a constant inflammatory reaction which varies within wide limits, depending upon the amount and nature of the injurious agents, and upon the severity and character of the injury. Occasionally the surface is found in a state of ulceration. This ulceration may be the result of infection following the formation of the pocket by separation of the epithelium, i.e., secondary to pocket formation, or it may represent the condition by which some pockets in the pericementum are formed, viz., ulceration having taken place in the cemental gingivae, by its extension into the pericementum, the principal fibres are stripped from the cementum, and a pocket is formed thereby, the soft tissues of which are ulcerative. Ulceration, however, is not a prerequisite to a suppurative pericementitis as the inflammatory exudate may pass from the tissues, through the epithelium, into the pocket.

The cementum underlying the pocket and from which the soft tissues have been detached always presents a septic surface. This is due to the frequency of seral deposits, to the retained ends of the principal fibres in the insertion layer, and occasionally to small remnants of necrotic pericementum adhering to the cemental surface.

Deposits of calculus are not as a rule found extending to the depth of the pocket. Almost invariably in pocket formation, the soft tissues are detached from the cemental surface, to a considerable degree in advance of the deposition of calculus. Seral calculus is, therefore, not a primary agent in pocket extension. Its precipitation occurs subsequent to the separation of the soft tissues from the cementum. As mechanical injurious agents as well as chemical irritants, e.g., toxins derived from contained bacteria, these concretions act as sustaining factors in the maintenance of inflammation of the overlying soft tissues.

The type of exudation from periodontal pockets is commonly known as pus, and is made up of leukocytes in abundance, serum in varying quantities, fibrin usually of scant amount, and living and dead bacteria. Of the leukocytes, the polymorphonuclear predominate, although endothelial leukocytes and lymphocytes may be fairly abundant.

#### PHASE 4.—RAREFYING OSTEITIS INFECTIVE.

By the proximity of a pericemental pus-pocket to the alveolar tissues and due to the absorption of strong toxins, the blood supply to these tissues is further increased. The inward surface of the bone is, in reality, covered with a layer of granulation tissue, which accounts in part, for a greatly increased blood-supply. The medullary spaces consequently increase in size, and disappearance of the trabeculae of the spongy bone substance takes place. The rarefying process is characterized by osteoblastic and osteoclastic absorption.

#### CONDENSING OSTEITIS.

Where the irritation is not so intense, either from a bacteriological standpoint or from pressure, condensation of the osseous tissues takes place. By increased osteoblastic activity, the lamellae undergo progressive thickening and the marrow spaces are correspondingly reduced. Clinically, this condition is often the only change noted about teeth in over-function. Here it may be looked upon as a compensatory effort on the part of the bone to maintain a state of equilibrium. The toxins of bacteria of low virulence by their mild irritation, are also causative factors in the production of condensing osteitis.

### PATHOLOGY OF THE DENTAL PULP

The pulp being a very soft tissue in intimate relation with, and enclosed in a hard covering of dentine, presents to the student of dental pathology, many obstacles in the process of fixation and sectioning. The difficulty of perfecting a technique by which the tissue can be examined microscopically, with a minimum of change brought about in the process, and the fact that the normal structure is not thoroughly understood, accounts in part for much of the obscurity surrounding the true pathological changes in the dental pulp. By keeping in mind the following peculiar characteristics of this organ, as a background from which to view these morbid changes, the essayist feels that the modifications of general principles, manifested in this tissue, will be better appreciated.

(1) The absence of collateral circulation in the dental pulp causes it to pass quickly from certain hyperemic conditions to infarction and necrosis.

(2) The pulp is encased in a hard unyielding tissue, the dentine, and in hyperemic disturbances, this prevents swelling and restricts the exudation of serum.

(3) The great vascularity of the dental pulp, the delicate structure of the walls of the blood-vessels, and the semi-fluid nature of the matrix, render this tissue susceptible to circulatory changes.

(4) A state of balance is present in the normal pulp, with an abundant vascular supply on the one hand and a protective covering of tissue on the other. Loss of this tissue, so often the case as in caries, abrasion or erosion, creates a new condition, subjecting the pulp to increased irritations.

(5) The fact that there is but one outlet for the veins, increases the danger of strangulation.

(6) Owing to the close relationship between the blood supply of the pulp and the pericementum, disturbances in the pericemental circulation are frequently manifested in the pulp. The periapical pericementum receives blood-vessels from the medullary spaces of the bone, some of which, on sub-division pass through the apical foramen into the pulp. In the majority of cases of traumatic occlusion, the periapical tissues are subjected to a force of unnatural magnitude. The dental pulp, then, is peculiar in that its blood-supply passes through a region subject to circulatory disturbances of traumatic origin. These, in turn, are often manifested in the pulp.

It is our opinion that many necrotic pulps of an otherwise obscure etiology and certain of the degenerations of the pulp, because of nutritional interference, can be accounted for in this way.

(7) The pulp on account of its delicate structure is peculiarly subject to degenerations.

## LESIONS PRODUCED BY SPECIAL INJURIOUS AGENTS

### (1) SUDDEN CHANGES OF TEMPERATURE.

Extremes of heat or cold produce alterations in the circulation of the pulp. Loss of normal covering of the pulp renders it susceptible to lesser extremes. Frequent sources are hot and cold foods, the polishing of fillings, and the injudicious or unscientific grinding of enamel.

#### (REACTION.)

We are inclined to hold that the "physiological" hyperemia in mild thermal changes is largely a capillary one. The periphery of the pulp is supplied by a rich capillary plexus and is affected first in stimuli from without. The hyperemia brought about by a stimulation of the vaso-dilators (neurotonic). When these stimuli are repeated in excess, a "pathological" hyperemia is produced, by the paralysis of the vasocontractors (neuro paralytic). The onflow of blood through the capillaries is hindered, more blood is poured into the arteries, with the result that they become congested.

A direct arterial hyperemia is often the result of sudden thermal extremes. The arteries are expanded and varicose, the plasma zone is lost, and the vessels are filled with masses of densely packed red and white blood-cells. Areas can be seen in which the red cells have escaped into the surrounding tissues. The veins are collapsed, circulation cannot be restored, and the pulp dies.

### (2) A BLOW.

The arteries which nourish the pulp and pericementum have a common origin. The same is true of the nerves. An injury to the pericementum from a blow on the tooth, is often manifested in the pulp as a direct arterial hyperemia. If the blow has been severe, the capillary anastomoses at the periphery of the pulp are not adequate to carry on the circulation, a pathological hyperemia results, followed by death of the organ through infarction. Greenfield, of Edinburgh, has demonstrated that within five hours after an obstruction, an infarct is always intensely congested and reddish purple. Later when necrotic changes have taken place, the part becomes paler and of pinkish color. The condition known as "coagulation necrosis" takes place at this stage. The cells undergo the changes peculiar to necrotic cells, finally becoming homogeneous. Cells, capillaries and their contents become more or less fused with each other, forming a structureless mass.

### (3) TRAUMATIC OCCLUSION.

In every case of traumatic occlusion, undue pressure is exerted in the direction of the long axis of the tooth. The entire pericementum is subjected to an abnormal strain, and invariably there is produced a circulatory disturbance, varying in degree, throughout this tissue. Certain types of traumatic occlusions tend to produce an excessive condensation of the periapical pericementum. Dependent upon the intensity of this condensation, the blood-vessels are more or less constricted and the flow of blood through them is partly cut off. When the pressure is removed, there is a consequent dilation of the blood-vessels. Owing to the close relationship between the blood supply of the pericementum and the pulp, this disturbance is frequently manifested in the pulp, as an arterial hyperemia.

### (4) BACTERIA.

Exposure to carious dentine is the greatest source of infection to the dental pulp. Other

common causes are accidental exposure and contact with the saliva through fracture in the dentine and from the general circulation.

In caries, bacteria gain entrance into the pulp shortly after the dentine in contact with it becomes softened.

When the acid produced by bacteria on the surface of the enamel has dissolved out the cement substance between the enamel rods and has filtered down through the spaces formed, to the amelo-dentinal junction, decalcification of the dentine soon follows. Shortly after the enamel rods begin to fall out, bacteria find entrance into the fine tubules at the periphery of the dentine.

The dentine is continually decalcified in advance of the growing micro-organisms which easily pass along the tubules. Due to the action of enzymes produced by the bacteria, the organic matrix is changed and the infected tubules become enlarged. In many instances the enlargement is regular along the whole course of the tubules, while others are characterized by the presence of oval swellings situated here and there upon the tubules. The former have been called "pipe stem" tubules, and the latter "liquefaction foci."

These foci are crowded with bacteria and many of them fuse together to produce cavities which ultimately destroy the dentine.

As was stated before, bacteria find entrance into the pulp shortly after the dentine in contact with it has been decalcified. The softened dentine is filled with micro-organisms, and the pulp is practically exposed to the saliva. These micro-organisms, including pyogenic ones, make their way through the odontogenetic zone, passing between the odontoblasts into the "basal layer of Weil," where they usually spread laterally. The toxins and injury done to the tissue cells soon induce an abundant emigration of polymorphonuclear leukocytes. In addition fibroblasts and vascular endothelium proliferate abundantly to replace cells of their own type which have been destroyed.

Necrosis, occurring quickly for a definite area surrounding the bacteria, is the characteristic injury produced by the toxin of the *staphylococcus pyogenes aureus*. Through the action of the ferments secreted by the polymorphonuclear leukocytes, the necrotic tissue is digested and softened, so that abscess formation occurs.

In our sections on infections of the dental pulp, the areas of leukocytic infiltrations seems to fall in three groups.

- (a) The infiltration is regional and superficial. Upon removal of the softened tissue and exposure to the saliva, it is followed by a progressive ulceration.
- (b) The infiltration is regional, often multiple, and deep within the substance of the pulp, followed by liquefaction and pus production, and death to the pulp.
- (c) The infiltration is diffuse, with a predominance of plasma cells

## REPAIR

Lesions involving destruction of tissue as in necrosis or abscess formation, tend to heal by granulation tissue. This term is applied to young tissue composed of fibroblasts and vascular endothelium which are producing to replace destroyed connective tissue and blood-vessels. The fibroblasts appear as flat elongated cells with large pale vesicular nuclei containing a delicate framework of chromatin. The cytoplasm extends from each end of the cell as one or more processes. Hand in hand, new capillaries are formed from the proliferation of the endothelium lining the dilated superficial capillaries. They appear at first in the form of pointed buds consisting of spindle-cells with cytoplasmic processes which are sent out first. The individual buds tend to grow towards one another and form narrow columns which unite laterally to construct a ramifying vascular net-work. Finally many of these newly-formed capillaries disappear, while only the largest ones persist in the fully-formed scar tissues. The essential part of granulation tissue is fibroblasts and vascular endothelium. The ability of the pulp to produce these is very marked and we cannot help but believe that recovery from a slight infection would readily take place if the surrounding conditions were made favourable. As a matter of fact, the conditions for repair are usually very unfavourable and the granulation tissue is always complicated by the presence of foreign bodies as necrotic cells, red blood corpuscles and bacteria. A purulent exudation continues to pass through the newly formed tissue which is progressively included in the destruction process and ends in the death of the organ.

NOTE.—The opinion has been expressed many times that the power of healing is very low in the pulp.

### (5) SHARP EDGES OF THE PULP CHAMBER IN CARIOUS CAVITY. HYPERPLASIA OF THE PULP.

This is a chronic inflammatory condition, associated with caries that has produced a fairly large perforation of the wall of the pulp chamber and a consequent exposure of the pulp. The margins of the pulp chamber are sharp, and, apparently, are etiological factors in the formation of a large soft mass of tissue which pushes out into the cavity. The growth consists of :

- (a) A superficial layer of stratified squamous epithelium which appears to occur there as a result of transplantation of epithelium from the gingivae.
- (b) A stroma of fibrous connective tissue which forms a supporting frame-work.
- (c) The bulk of the mass is composed of granulation tissue of a low type. The cells are large and round, or oval with large nuclei.

Hopewell-Smith gives the following very excellent description of this tissue : " It is composed largely of cells of the mesodermic type of variable size, round or oval, derived directly from pre-existing cells, and chiefly concerned in the formation of the bulk of the mass of the new tissue ; of the plasm cells of Unna ; of many polymorphonuclear hyaline leucocytes ; of large mononuclear hyaline leucocytes, which are considered by Wetchnikoff to be able to become transformed into fixed connective tissue cells ; of mast cells, so-called ; and finally, if necrotic material is present, or if foreign bodies, e.g., a splinter of dentine, exist, of multinucleated giant cells, whose function is somewhat of a phagocytic type."

### (6) STIMULI WHICH INCREASE THE IRRITABILITY OF THE DENTAL NERVES AND FIBRILS.

From a histological aspect, many different types of calcified formations are added in the course of pathological conditions in the pulp, to the primary dentine. Usually, it is not difficult to distinguish the secondary growth from the first formed dentine. From a calcification that closely resembles the normal dentine, to a tissue that does not seem to have a point in common with it, countless variations may be found and it would be impossible to make a classification that would include all. However, from hundreds of sections prepared by the writer, most types can be included in seven main groups. The work of Black was followed in these investigations, and the essayist wishes to acknowledge the free use of his classification, in part, in this work. The method of preparation applied in the study of the coarse and delicate branchings of the dentinal tubules was of the greatest value in the work on these different types of secondary calcifications.

#### (a) TRUE SECONDARY DENTINE.

(a) In this group, the secondary formations resemble more than any of the others the primary dentine. The tubules are continuous with those of the primary dentine and extend to the surface of the pulp. Generally, the tubules are fewer in number, and quite often there is some deviation from the course of the original tubules.

(b) A secondary dentine in which the tubules at first resemble the normal dentine, but gradually become irregular and disappear, succeeded by a clear calcification.

(c) Calcifications attached to the walls of the pulp chamber which are homogeneous throughout. Regarding this type, Hopewell-Smith describes it as follows : " This new kind of dentine has, as its favorite site, the base of the carious excavation into the pulp chamber. It may be irregularly rounded in shape. Its structure in some places conforms to that of a more or less homogeneous ground glass-like matrix, similar to that of hyaline cartilage : in others it has a distinctly granular or fibrous appearance."

(d) Secondary calcifications which are made up of clear or granular areas and irregular tubules, twig-like tufts and breaks resembling lacunae in bone.

(e) Tumor-like masses of secondary dentine which have grown into the pulp tissue and are attached to the primary dentine by pedicles. Black has stated that these formations are rare.

(f) A secondary deposit, having the appearance of a mass of calcospherites fused together.

(g) Osteo-dentine. A secondary formation in the pulp chamber attached to the primary or secondary dentine, and which contains lacunae resembling those of the bone, embedded in a granular or tubular matrix. In the description of this type of calcification, according to Black : " The undoubted osseous formations met with in the pulp chamber of the human teeth are very rare. In making this statement I exclude all hard formations in which bone corpuscles are not present. This seems not to have been done by many who have written on this subject ; but, on the other hand, some writers seem to have called almost all irregular formations osteo-dentine. The great bulk of these have not the slightest resemblance to bone. The cases of osseous formations within the pulp chamber that I have met with, have all presented the general characters of cementum and have been found in the root-canal attached to the dentinal wall or resting upon some irregular formation which separates them slightly from the dentine."

## (7) ARSENIC.

The changes that occur in the dental pulp as a result of the action of arsenic are as follows :

(a) The endothelium lining of the blood-vessels is destroyed and everywhere throughout the pulp a general diapedesis of red cells has occurred. Upon examination of a large number of pulps one cannot help but notice the absence of vessels lined with normal endothelium.

(b) The connective tissue cells appear larger than usual, but the connective tissue fibres and the odontoblasts seem to have undergone no change.

(c) Arkovy states, in regard to its action upon the nervous tissue : " The effects upon the neurilemma is to somewhat increase the number of its nuclei while in the axial part granular destruction of the myelin sets in, and the axis-cylinder begins in various locations to disappear, while in others the notchy tumefaction of the axis-cylinder usually seen only in cases of central lesion, can be plainly made out."

(d) Arkovy found also that arsenic trioxide, when applied to a vital pulp, did not produce coagulation of the tissue.

The degenerations of the dental pulp may be found in detail in Bulletin No. 4, issued by the Canadian Dental Research Foundation.

## HISTO-PATHOLOGY OF THE PERIAPICAL TISSUES

Periapical disease bordering upon the cementum and with which the practitioner comes into contact daily, may be divided into three main classes :

(1) Granulomata.

(2) Abscesses.

(3) Dental Cysts.

(1) In general, a granuloma represents a reaction to a mildly injurious agent, exemplified in the periapical tissues by bacteria low in virulence, chemicals in low percentage used in root canal treatment and mechanical agents not severe in character. The actual injury produced by these types of injurious agents is slight as a rule, and seldom can be shown morphologically. On the other hand, the inflammatory reaction is usually marked and frequently leads to serious consequences. This reaction as demonstrated in the dental granuloma always takes place at the site of injury, the usual location being the apex of a tooth. However, accidental perforation of the bifurcation of a multi-rooted tooth or through the cementum on the side of the tooth, quite often leads to the production of this lesion in these areas.

A granuloma consists, as the name implies, chiefly of granulation tissue. At the expense of the resorption of the alveolar stratum durum, the granuloma increases in size, and finger-like extensions project, into the medullary spaces of the bone. During our work on the subject, Thoma's classification was studied, and will be used in the following :

## (a) SIMPLE.

The type of granulomata consists chiefly of a proliferation of vascular endothelium and fibroblasts. The site of the injury becomes infiltrated with lymphocytes and in smaller numbers polymorphonuclear leukocytes. Endothelial cells are frequently seen in large numbers owing to the presence of certain foreign substances. A conspicuous feature of nearly all granulomata is the presence of many plasma cells, easily differentiated from the lymphocytes by their eccentric nuclei, often two to four in number. They also differ from the lymphocytes in the "large increase in the amount of cytoplasm, which has marked basophilic properties except for a small acidophilic area adjoining the nucleus in which the centrosomes are always found." (Mallory).

The function of the lymphocytes is believed to be the neutralization and disposal of injurious substances absorbed through the lymphatics. With increase in size of the granuloma and absorption of the stratum durum, its outer portion is characterized by the arrangement in bundles of connective tissue fibres, which lie, as a rule, in a direction parallel with its outer surface. This has been termed the capsule. Extensions of the capsule project into the medullary spaces of the bone. Examination of a number of sections very often reveals the presence of small areas of osseous tissue, which have become isolated from the alveolar process. The capsule is highly vascularized, numerous fairly large blood-vessels maintaining communication between the inner parts of the granuloma and the surrounding bone.

Beneath the capsule there may be distinguished a much thicker layer of less dense reticular connective tissue, containing a great number of lymphocytes and plasma cells and some polymorphonuclear leukocytes.

## (b) EPITHELIATED.

When the pericementum contains the epithelial cords described previously, "the masses epithelax of Malassez," and upon involvement of these cells in the inflammatory process, a striking feature of the microscopic picture in their proliferation through the tissue, in the form of plugs, strings on trellis work. Winding and branching cords often constitute a net-work of epithelial cells through the lesion. This type is known as an epitheliated granuloma.

## (c) GRANULOMA SHOWING NECROSIS.

Here and there throughout certain granulomata, areas may be noted where a number of cells are separated from the others and have undergone degeneration. Usually in this type there is an increase in the number of polymorphonuclear leukocytes. We regard this lesion as a potential abscess. When the destructive process becomes extensive and suppuration results; if the connective capsule is not broken down, the condition is known as blind abscess. In certain cases, however, a sinus to the gum is produced.

## (d) DENTAL GRANULOMATA SHOWING RETROGRADE PROCESSES.

Evidence is seen in many sections of granulomata of cholesterol formation. "Cholesterol crystals can be recognized by the rhomboid spaces left by the crystals during dehydration in alcohol." (Thoma.)

## (e) DENTAL GRANULOMATA SHOWING CYST FORMATION.

In epitheliated granulomata, showing in certain areas, evidence of degenerative processes, the epithelial cords, previously described, manifest a definite tendency to surround and encapsulate such foci. This can be looked upon as the beginning of root-cyst formation. True simple granulomata contain no epithelial cell clusters, and for this reason can never develop into the root cysts. Dewey, in speaking of beginning cyst formation has stated: "Strands grow out from this epithelial layer into the granulation tissue and encircle and snare off other regions, which being cut off from the surrounding tissue, are poorly nourished, and hence the tissue undergoes degenerative processes. When these are complete, the epithelial barrier is also dissolved and the detritus added to the cystic content."

On the same question, Prieswerk has written the following: "The epithelial cells generally lie close together but in some areas they are interrupted by minute lacunae which are filled with granular fragments of degenerated cells. Such lacunae may be considered primitive cysts. for they develop later into large cystic cavities lined with epithelium."

## ABSCESSSES

- |            |   |                                       |
|------------|---|---------------------------------------|
| 1. ACUTE   | { | (a) Blind.                            |
| 2. CHRONIC |   | (b) With a sinus.                     |
|            |   | (c) Discharging through a root canal. |

1. An acute alveolar abscess may be regarded as a reaction to strong injurious agents and the injury produced by them. In the periapical tissues, this is usually brought about by the invasion of a large number of pyogenic bacteria into these tissues from the root canal.

An initial temporary constriction of the arteries is followed by a dilatation of the vessels with a more rapid flow in the blood stream. Then the blood flow becomes slower although the dilatation continues. The veins show an increase in their calibre with increased flow of blood followed by a slowing in the rate of the flow. In some capillaries and veins, flow of blood may entirely cease.

Following a margination of leukocytes along the vessel-walls into the spaces between the principal fibres of the pericementum which pass from the cementum to the alveolar wall, there takes place an emigration of these leukocytes which by altering their contours and piercing the vessel-walls pass out into the lymph spaces of the periapical tissues. The polymorphonuclear leukocytes play the most important part in this type of inflammatory reaction and are the first to pass through the walls of the vessels into the surrounding tissues. In the capillaries, red blood cells as well as the leukocytes pass through between the endothelial cells, but their movement, unlike the leukocytes, is entirely a passive one.

Some of the constituents of the blood plasma pass from the blood-vessels, which the leukocytes and red blood cells. The function of this serum is to dilute the toxic substances formed by the bacteria and to neutralize their action. At this stage due to these changes, there is a great increase in the thickness of the pericementum and the tooth is somewhat elongated in its socket. This is known as acute pericementitis. If the conditions continue, destruction of

tissue takes place, and there is noted between the fibres small collections of pus. If the inflammatory reaction is prolonged, disappearance of the principal fibres occurs by solution, due to the action of ferments secreted by the polymorphonuclear leukocytes. After the loss of the stratum durum of the alveolar process, the pus thus formed infiltrates the cancellous part of the bone, and an exit to the outer bony plate is provided by one or more Haversian canals.

When the pus reaches the periosteum, one of two events may happen. In some cases, this tissue is lifted from the bone, the pus collecting underneath, in others, by necrosis and tissue solution, a sinus is established through the adjacent tissues to the surface. If the pus be evacuated and the injurious agents eliminated, it remains for the cells of the part to fill in the areas lost in process. Fibroblasts and vascular endothelium are formed and the space is quickly filled up. The fibroblasts, as time passes, become more fusiform in shape and elaborate processes which anastomose. The collagen fibrils increase in amount, many of the fibroblasts and blood-vessels disappear, the connective tissue formed becomes denser until in the final stage, it is known as scar tissue.

## (2) CHRONIC.

Chronic periapical abscesses which remain attached to the tips of the roots after extraction, when viewed macroscopically, present the appearance of small soft, red or yellow swellings. Upon incision, they prove to be thin connective tissue capsules or sacs containing pus. Those cases which present no route of discharge of pus are known clinically as blind abscesses, and frequently are formed from granulomata which have undergone purulent degeneration. Where a direct route of discharge is present, in its most common form there is a sinus extending from the abscess to the surface. Quite often, however, the pus finds an exit through a root canal which has offered a path of least resistance. The abscess capsule is made up of bundles of connective tissue fibres, the arrangement of which is similar to that found in the granulomata. Projections of this connective tissue capsule extend into the medullary spaces of the alveolar bone.

## 3) ROOT-CYSTS.

Development of the fifth class of granulomata, previously described, in which there are noted areas containing fragments of degenerated cells, and surrounded by squamous epithelium, progresses by dilatation of these lumina. Such dilatation is believed to take place by an increase in the liquid content of these lacunae whereby the connective tissue layer is pressed towards the periphery. Thus, the outer capsule of the cystic sac is formed. The epithelium is displaced and changed into the smooth membrane of the cystic sac. As the cyst becomes larger through increase of the fluid content, the surrounding bone becomes progressively thinner. Fischer believes, that the cystic fluid is due to the mucinous softening of the surrounding connective tissue; that the space lined with epithelial cells is filled by a fluid thus formed which passes through the epithelial layer. It is also his belief that an inflammatory exudate may diffuse through the cellular wall.

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# The Place of the Canadian University in the Community

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BY VINCENT MASSEY.

*President National Conference on Education and Citizenship.*

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[The above heading is the title of an address given last month before the Canadian Club of Montreal. In the paragraphs that follow are portions of Mr. Massey's remarks dealing with questions of interest to all friends of the universities of Canada.]

THE tendency towards broadening the curriculum until it should include practically everything that the public could think of or ask for, a tendency that appears in some American universities, Mr. Massey scored heavily. "A university, it will be said, should

teach everything. Well and good. Those subjects with which it deals, however—if the university has any function which distinguishes it from other institutions—should be capable of being reduced to fundamental principles. Their direct application must be left to other and more appropriate agencies. I have labored this point because one of the dangers of the modern university is suggested by our desire to make it practical. If by practical is meant that the university should be closely related to the life of the community, then none can withhold approval; but if this persistent word denotes a frankly utilitarian purpose, then let us save the university from becoming merely a business college or a senior technical school.

“What are the distinguishing characteristics of our Canadian universities?” Mr. Massey asked. “In the first place, the best of the Canadian universities have an established reputation for thoroughness. Our equipment may be often inadequate and our methods perhaps too elementary, but the instruction in the colleges of the country is sincere and, according to the standards of a new country, sound.

“Again, in Canadian university life, the principle of academic freedom is, I think, more securely established than elsewhere in America. There, one frequently hears of violent clashes between a board of trustees and a professor who ventures, either in the religious or economic spheres, to utter what is locally regarded as unorthodox opinions. Such issues are very rare in Canada. Free speech is a British virtue and we have inherited it, in some measure, at least. The Canadian university assumes an attitude of wise tolerance to the expression of thought in a community which presumably exists for the purpose of free enquiry.

“The real purpose of our universities is to train men and women to be leaders, straight-thinking men with active imaginations.” Mr. Massey believes the growth in numbers of students at our universities has interfered with the accomplishment of this end. “There are, past a doubt, many persons in our universities who would be better somewhere else, and the important question naturally suggests itself, in a democracy (particularly in a state university), should every one be admitted to a college course who wants to come? Is it undemocratic to refuse a higher education to any one who wants it?

“But surely the least democratic thing in the world is to impair the training of the future leaders of democracy by submerging their place of training with a flood of unsorted humanity greater than it can hope to assimilate. Surely the university is no place for boys and girls to whom direct contact with life would be a better education, and we should have the courage, in their own interests as well as those of higher education, to keep them out. On the other hand, let us provide scholarships so that no boy or girl of unusual promise

should be debarred from such an education by the inability to pay for it, and thus make higher education genuinely democratic to a degree we have never yet reached.

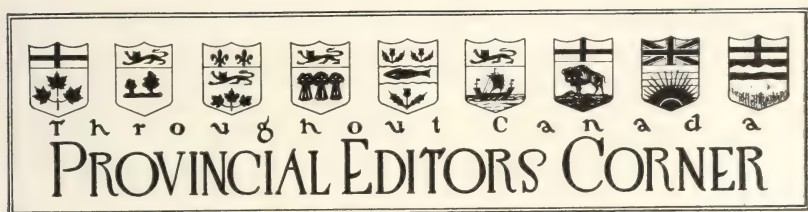
"Our universities have suffered no end of damage from the weight of mere numbers. With the thousands to be dealt with it is no wonder that they look on students not as individuals but rather as a mass of humanity to be educated *en bloc* by wholesale examination and formal lecture, which is the only way in which great numbers can be handled cheaply. Mass production is highly desirable in factories, but it plays havoc with education."

Mr. Massey deplored the lack of facilities for research and advanced work at our universities. The lamentable failure to supply such facilities "may be responsible in part for the fact that so many graduates of Canadian universities are permanently lost to Canada. It is a shock to learn that out of about 22,500 graduates from the two largest English-speaking universities in Canada, more than 3,400, or about fifteen per cent., are living across the border. This is a loss of trained minds which we can ill afford."

One sphere of scientific enquiry is often overlooked in our universities, that of political science. "In a country like ours, full of constitutional experiments, with the complications of a federal system and a racial problem, and at a time when external relations are under review, would it not be well if a few people were bringing trained, unhurried thought to bear on these questions for the benefit of politicians who have no time or perhaps have not the courage to think for themselves? It is not only the problems of natural science that need our hardest thinking."

Mr. Massey closed with an appeal for the support of our Canadian universities not only in money but in sympathetic interest and in our best thought. "In return they can render in full measure a service not to be estimated.

"They have a significant relation to our national unity. There is no country where unity is so important and has so sternly to be fought for as in Canada. Geography is against us. Language and race present unusual problems. Occupational divisions are sharp and bitter. The university, with its tradition of forbearance and tolerance, with its detached, dispassionate search for truth, its disregard of external differences provides a place where east and west, French and English, labor and capital, town and country can meet, and do meet, on a common and neutral ground, and exchange ideas and learn mutual toleration. The university, as an institution, will be justified tenfold by the part it will play in the great task of developing out of the materials that make up this country a common spirit—we do not yet know what it will be—that can be called Canadian."



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### MARITIME PROVINCES.

THE monthly meeting of the Halifax Dental Society was held at Dr. Hennigar's home on March 9th. The programme for the evening was: Paper by Dr. John Cameron, "People Who Dwell above the Clouds"; Paper by Dr. J. Stanley Bagnall on "Clasps." Both papers led to considerable discussion. Dr. W. H. Beckwith sang a number of solos. The evening was one of the best the Society has ever held, and we cannot recommend any better "get together" meeting for the small society than to persuade one of your members to open up his house for the evening. It will be a success if you are fortunate in having as genial a host as Dr. Hennigar.

\* \* \* \*

Representatives of the provinces of New Brunswick and Nova Scotia met recently in Truro and drew up preliminary plans for a Union Meeting of the dental societies of the two provinces. It is planned to hold the meeting in Moncton early in July. One of the best meetings ever held in the Maritime Provinces was a Union Meeting in Moncton in 1913. It is hoped that there will be a large number of members in attendance. These Societies may be a long piece away from the large centres, but they have been very successful in late years in getting some of the best known clinicians to lecture and demonstrate to them.

Leave your troubles at home, crank up the Ford and drop in and see us at Moncton.

\* \* \* \*

The following interesting case, in view of the present interest in diet, has been reported by Dr. Arrabelle C. MacKenzie, who is in charge of the Pre-School Age Dental Clinic of the Mass-Halifax Health Centre. A three-year-old girl whose parents are very poor Assyrians was brought into her clinic. It was found, on examination, that she had definite pyorrhea pockets on her two lower central

incisors, and the left lower molar was so badly involved that it had to be extracted. There was no caries present. Both legs are badly deformed from rickets. Local treatment of the pockets is being carried out; and in addition one of the housekeepers of the clinic has visited the house to give instruction in diet. Milk, whole wheat bread, and tomato juice, are now being supplied to the family.

\* \* \* \*

Dr. F. E. Lent has moved from Tatamagouche and is practising with Dr. Himmelman in Lunenburg.

Dr. G. P. MacIntosh has moved from Great Village to Spring Hill.

Dr. F. E. McLellan who has been practising in Westville has opened another office in New Glasgow.

Dr. C. E. Dexter of Digby has sold his practice, and it is understood he intends to stop practising in the near future.

Dr. B. R. Coysh has moved from Chester to Lunenburg.

Dr. H. V. Ferguson, who was practising in Dr. Polly's office in Lunenburg, has opened an office in Tatamagouche.

J. S. B.

#### BRITISH COLUMBIA.

THE Vancouver Dental Society has carried on a very successful series of monthly clinics during the past winter. The old plan of study-club groups has been temporarily suspended in favor of a series of group clinics each month. By this method it has been possible for a number of phases of the work to be well demonstrated to the members.

Our first two clinics were under the direction of Dr. John F. Hill, and included very highly successful demonstrations of inlay preparations and technique (direct method); Synthetic porcelain and amalgam restorations; and condensed foil operations. The last two months' work have been under the direction of Dr. T. W. Snipes. All steps in the indirect gold inlay method were demonstrated; and baked porcelain inlays made and discussed. A feature of the last meeting was an exodontia clinic given by Drs. J. M. Jones and E. L. Cox, together with pyorrhea and prophylactic work and root-canal technique.

Each member takes the afternoon off, and attends the clinic. Demonstrators and critics are in attendance at each demonstration. The evening session includes a discussion of the work done and criticism of methods and results.

Two very interesting papers on diet in relation to mouth conditions were given at our last monthly meeting, one by Dr. Howard Spohn, Pediatrist, and the other by Dr. W. J. Lea, Orthodontist. Both papers were intensely interesting and instructive and gave rise to considerable discussion.

Dr. Lennis Teeporten, recently of Grand Forks, has taken up practice at Kerrisdale, one of Vancouver's rapidly rising suburbs.

A very enjoyable dance was held on Thursday evening, February 22, under the auspices of the Ladies' Auxiliary of the Vancouver Dental Society. While weather conditions and prevalent illness made some inroads upon the attendance, a very nice crowd was on hand. A feature of the evening was a number of dances given by children, showing commendable polish and training.

The Vancouver Board of Trade is taking an interest in the matter of establishing a dental infirmary for the care of indigent patients. A report in this connection has been presented to the council of the Board, and early developments are expected. The Vancouver Dental Society has adopted a resolution offering voluntary dental service for the maintenance of this infirmary should it be established.

A. T. O.

#### ALBERTA.

**C**REDIT should be given to Dr. O. F. Strong of Edmonton, and Dr. V. H. Macauley of Calgary for the excellent educational and Oral Hygiene work they have accomplished for the Alberta Dental Association during the past winter.

A lantern and several complete sets of slides suitable for such work, and outline lectures for use as suggestions for lectures are in charge of Dr. Strong, and a duplicate outfit has been collected by Dr. Macauley. These lantern equipments have been sent to a number of Dentists in different towns in the Province, and lectures have been given by local men to their own communities at points all the way from Grande Prairie and Peace River in the North to Lethbridge in the South. It is to be hoped that advantage will be taken of this opportunity to do a real community service, by members of the profession in every town in Alberta in which such members reside.

In addition to the above an effective local work has been done in Edmonton and Calgary.

Dr. Strong and his committee have sent out literature to Dentists in the North half of the Province, and also letters to local improvement societies such as the Community Leagues of Edmonton. Six lectures have been delivered to Community Leagues, the Normal School students of Edmonton have been given lectures especially relating to Oral Hygiene for children, and steps are being taken to have the same lectures delivered to the students at Camrose Normal School.

The work of Dr. Macauley and his assistants has been equally effective. Lantern slide lectures have been given to the Calgary Child Welfare Association, Provincial Women's Institute Convention (500 at lecture), nine Parent-Teachers' Association meetings, Calgary Normal Students (400 students), and two Radio lectures by courtesy of the Calgary Herald and the Red Cross.

To quote a report of Dr. Macauley:—"We are endeavoring at present to arrange to have a Dentist appear upon the programme of any Annual Teachers' Convention held in the Province. We must reach the teachers both through the Normal School and Teachers' Conventions as these are the people who must carry the Oral Health message to the vast rural population, which is not in proximity to any Dentist. . . . Radio broadcasting also offers an unlimited field for educational work."

The writer thinks the above a very splendid showing. In fact he is led to wonder as he considers the work of Dr. Macauley, with which he is more familiar, whether the gentleman in question, after attending to a busy practice, the demands of an official Masonic position, and his duties on the Calgary School Board, as well as other matters, ever has time to dry the supper dishes, or drive a nail or two or put the baby to bed!

J. W. C.

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CAST PLATES FOR PLATINUM TUBE AND NON-PLATINUM TEETH.—In this method of using tube teeth, the old objection to the labor of grinding down the base of each tooth, and fine-fitting it to the plate, does not hold good: the posts, which should be of No. 1 dental alloy wire, cut to the proper lengths, are inserted in the tube teeth; the teeth with the posts in them are pressed into the wax, the wax is then contoured, and the bite is taken. The tube teeth are then removed from the posts; the posts are left standing in the wax, and the wax form, with posts in position on it, is then embedded and cast. To facilitate removal, the tubes of the teeth should be oiled before the posts are inserted in them. After the casting is completed, the teeth are cemented on the posts with a good oxyphosphate of zinc cement.—*British Dental Journal*.

TIME SAVER IN THE PREPARATION OF NOVOCAIN SOLUTIONS.—In the preparation of Novocain solutions often considerable time is used in holding the dissolving cup over the flame, waiting for the distilled water to boil down to the proper volume. As a time saver, I have devised a simple wire holder which any one can construct in a few minutes.

Take the ordinary wire holder for the ten cubic centimeter dissolving cup and bend the cup holder part at right angles to the twisted wire stems. Then bend the other end of the wire holder, the loop part, also at right angles to the twisted wire stem. Now cut the loop in the centre and curl the two ends of wire around the cone-shaped neck of an alcohol lamp, twisting one end downward and the other upward. This makes a very practical dissolving cup holder, which sets firmly and can be easily lifted off of the lamp.—G. A. SCHMUTZLER (*Dental Cosmos*).

# JUVENILE JINGLES

*Contributed to ORAL HEALTH by Dora L. Cameron,  
Wenatchee, Wash.*

## The Lazy Boy

The "Eye Tooth" peeped, said, "I see you there,  
You naughty molar, it isn't fair  
To let that awful cavity come.  
I see it hidden beneath the gum."

"It's not my fault," was the tooth's reply,  
"It's a lazy boy. I'll make him cry.  
I will start to ache this very night,—  
Keep him awake,—it will serve him right."

And sure enough, it began to ache,—  
The poor boy cried, as he lay awake.  
"I wish I'd done as my Mother said,  
Indeed I do," said the boy in bed.

He went to his Dentist, when morning came;  
He never had had so bad a pain.  
The Dentist looked, with his little glass,  
Said: "A case of neglect it is, alas!"

The little lad in the Dentist's chair  
Made up his mind, as he sat there,  
To use his toothbrush every day  
And never again let his teeth decay.

## Breathe Deep

Always have the windows down  
Before you go to bed;  
Never pull the covering up  
Away above your head:  
Fill your lungs with pure fresh air  
And breathe it way down deep;  
And in the morning you'll wake up  
Well rested from your sleep.

## Sleeping Outside

The little birds that sleep outside  
Are singing every morning,  
When little folks who sleep inside  
Are fast asleep and snoring.

I wonder if the out-door air  
Keeps them from being weary,  
And makes them waken every morn  
With song so bright and cheery?

## Dr. Mallory Removes to London, England

*[The profession will be glad to learn that Dr. Mallory has kindly consented to act as an occasional contributor to ORAL HEALTH, and it is hoped that the Canadian profession will thus be kept in closer touch with the dental profession in the British Isles.—EDITOR.]*



Dr. Fred. R. Mallory

THE dental profession of Canada has suffered a decided loss through the removal of Dr. Fred. R. Mallory from Toronto to London, England. Dr. Mallory has taken over the practice of Dr. E. Breadner White, at the address 30A Wimpole St., London, W.1.

Dr. Mallory was graduated from the Royal College of Dental Surgeons in 1900, and immediately began a very successful dental practice in Toronto, continuing for fifteen years. In 1915 he enlisted for overseas service with the General Hospital of the University of Toronto, and proceeded with that unit to Salonika, and at the close of his military service resumed practice in Toronto.

Dr. Mallory is a member of the Canadian Dental Association, Ontario Dental Association, Academy of Medicine, Academy of Dentistry, Chicago Dental Society.

In addition to this, he is a member of Lambton Golf Club, Toronto Hunt Club, Victoria Bowling Club, Military Institute, Empire Club, Royal Colonial Institute, London.

On the evening of his departure Dr. Mallory was tendered a farewell dinner by the Toronto officers of the University Hospital Corps and also by a large representative gathering of his professional brothers in the City of Toronto. During the course of the evening he was presented with a handsome silver case, and many regrets were expressed at his loss to Canadian Dentistry.

W. E. C.

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CLEAN FIXED BRIDGES.—Instead of making lower bridges for the posterior teeth with only reinforced cusps, such as are commonly termed sanitary bridges, it is better to make the bridge to correspond to the shape of a boat bottom, allowing the space between the bridge and the gum to be from one to two millimeters, as the operator may think best for the case in hand. These bridges are easily cleaned and comfortable.—W. E. McQUEEN (*Dental Cosmos*).

# ORAL HEALTH

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## EDITORIAL



### Should a Dentist Invest Capital in a Company Manufacturing Mouth Preparations?

A NUMBER of dentists have been approached recently, both in United States and Canada, regarding the investment of capital in companies to manufacture and sell prophylactic preparations to the public, along with a treatment for pyorrhoea. Two such companies are being organized at the present time in widely separated areas. The professed intentions of the promoters in each case, are to sell stock in small amounts widely distributed among members of the dental profession, and it is expected that these stockholders will recommend the products of the company both to their patients and their friends. It is suggested that the stockholders may change any of the formulae of the company, from time to time, and thus be in a position to honestly recommend the products and treatments as being in their judgment the best possible.

One of the stockholders in one of these companies said to the writer "Dental preparations and toilet articles are sold by the hundreds, and why shouldn't the dentist invest a little money in these things and get the profits?"

In what position will these shareholders find themselves as professional men? Would their patients consider them biased or influenced in favor of the dentifrice manufactured by their own company? Can such a shareholder maintain a position of independent censorship to advise his patients regarding the respective merits or demerits of other dentifrices? We believe not.

The ethics of the dental profession are being seriously challenged from both within and without the ranks of the profession. We believe that dentists should avoid even the shadow of suspicion, and refrain from investment of capital in any company having tooth preparations or other dental materials to sell to their patients, and concerning which their patients naturally and properly turn to them for professional advice.

## The Ontario Dental Convention

THE chief value of such an organization as the Ontario Dental Society is to be found in its annual meetings and conventions.

Such an organization, when functioning properly, will make all necessary arrangements for regular massed gatherings of the Profession where important dental problems can be discussed.

The Annual Convention of the Ontario Dental Society has, in recent years, assumed the status of an intensive post-graduate course on subjects of practical value to the general practitioner. The dentist who does not take advantage of such an annual "brushing up" will find himself gradually dropping behind his more aggressive colleagues in the matter of up-to-date services to his patients.

This Convention provides a yearly opportunity for every dentist to professionally and socially rub shoulders with the progressive men of the Province. It is really a professional stock-taking week for the conscientious practitioner.

Apart from all this, it provides for the dentist the advantage of meeting and listening to some of the most able men of the Profession discuss and present their views upon some of the difficult problems of dentistry.

The approaching Ontario Convention in the month of May promises to be one of real practical value to the dentists of Ontario. The Committee in charge has completed a programme of papers, clinics and exhibits that not one dentist in Ontario can afford to miss.

Such outstanding men as Dr. Walter Chapelle, of Buffalo, Dr. Fred A. Bricker, of Rochester, Dr. Spence Clappison, of Hamilton, supported by the Detroit Clinic Club, the Hamilton Clinic Club, and the Toronto Clinic Club, will together give to the Convention what may be taken as the last word on such subjects as Partial and Full Dentures, Gold Inlay Technique, Crown and Bridge Work, and the ever-present problems of Prevention, Prophylaxis, and Root Canal Technique.

The social and good-fellowship side of the Convention has not been lost sight of. There will be the regular Convention mid-day luncheons, the class reunions, the Board of Directors' Reception at the Dental College, the dinner dance, special ladies' gatherings, golfing and theatre parties.

*Come to the Ontario Convention and Bring Your Wife With You.*  
R. G. McL.

# ORAL HEALTH

A JOURNAL THAT STANDS FOR THE "OUNCE OF  
PREVENTION," AS WELL AS THE "POUND OF CURE"

VOL. 13

TORONTO, MAY, 1923

No. 5

## Lighting of Dental Offices

G. R. ANDERSON, M.A., MEM. I.E.S.

*University of Toronto and Royal College of Dental Surgeons.*

THAT good lighting is of the utmost importance to the dentist may be assumed to require no argument, yet it is unquestionably true that many dentists do their work under lighting conditions that are far from ideal. This is no doubt due in large measure to the fact that a dentist is not likely to be an expert in lighting, and so he accepts what the owner of the office provides for him, or what the dealer sells to him, and tries to make the best of it. He may realize that conditions are not satisfactory, but does not know how they may be improved, and being absorbed in the pursuit of his own line of work, allows the lighting to remain unimproved until he begins to suffer from eye strain. Then he realizes that he has been doing injury to his eyes, and very likely injustice to his patients, for no one can do the best work where the lighting is inefficient.

What, then, are the requirements of good lighting, and how may they be obtained? First: There should be abundance of light for the work in hand. Second: The light should be of the proper quality. Third: The contrasts in illumination should be just sufficient to prevent an appearance of flatness, so that space perception may be rendered easy. Shadowless illumination is not desirable. Fourth: The shadows should be soft and luminous, with no violent contrasts or dark spaces. Fifth: There must not be any dangerous glare to injure the eyes of the operator or give discomfort to the patient.

The suite of rooms constituting a dental office will not necessarily be lighted alike, indeed it is not desirable that they should be. They may therefore be discussed separately.

In the reception room the illumination may be somewhat subdued. Enough light should, however, be provided to enable anyone who wishes to read to do so comfortably. If artificial light is necessary, the bulbs should be concealed, as there is scarcely anything less attractive than a clear glass bulb at the end of a drop cord, or projecting from the wall on a bracket. Semi-indirect light from a fixture having a bowl or dense opal glass, or from floor lamps appropriately shaded, gives a soft, well diffused illumination. Whatever type is used should be made to harmonize with the furnishings, as it may be taken for granted that this room should be made attractive.

In the operating room the requirements are most exacting, owing to the varied nature of the work, the minuteness of detail to be discriminated, and the difficulty of avoiding dense shadows. Hence the lighting should be constant in intensity and of a fairly high level; it should also be perfectly diffused and flexible enough to be brought to bear on any surface under examination; and it must be of such a quality as to permit of accurate color discrimination. It may be presumed that the dentist will use daylight for a considerable portion of the working hours; how far, then, will daylight meet these requirements? So far as constancy is concerned, it is obvious that the variations in daylight are far greater than those of any artificial source. It is, of course, perfectly diffused if direct sunlight be excluded, but is not very flexible, and considerable difficulty would be encountered in trying to illuminate all dental surfaces by directing daylight on them. So far as color is concerned, daylight is also somewhat variable, depending on the time of day, the atmospheric conditions, and the direction of the windows. Hygienic considerations make it undesirable to exclude daylight from the operating room, but it should be controlled and supplemented by artificial light where and when necessary.

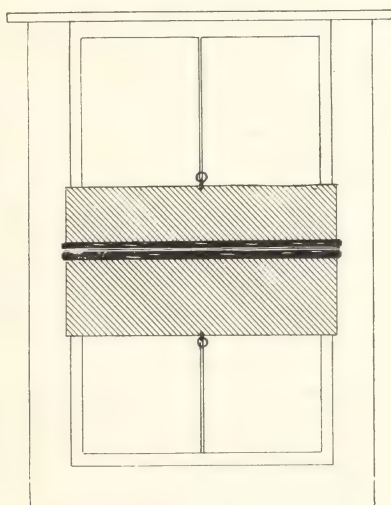
As to the orientation of the room; in the North temperate zone the light from the North sky is perhaps steadier than from any other quarter, but falls off more rapidly in the afternoon, and a room facing the North gets comparatively little direct sunshine, unless there be a second window facing East or West. If the room faces East, West or South, shades of dark material should be provided for the window opposite the chair. The best arrangement is to have a pair of dark shades placed at the middle and operating towards the top and bottom. This provides easy control and permits of either sash being opened readily. (See Fig. 1). Over the dark shades there may be a translucent linen shade operating from the top down.

In the South temperate zone, the steadiest light will come from the southern sky and this will probably be preferred by the majority of dentists in this region. Within the tropics both North and South windows are exposed to the fierce glare of the sun at noon, and it would seem desirable to choose a room having an Eastern exposure,

which would receive direct sunshine during the coolest part of the day, and would be free from it in the afternoon.

As to the size and outlook, it may be taken as a safe rule that the minimum vertical sky angle subtended at the chair should be about ten degrees, and that the glass area should be at least fifteen per cent. of the floor area of the room. If the window is partly shaded by trees, or walls of nearby buildings, particularly if such walls are dark in color, then day lighting alone can scarcely be satisfactory, except with a very large window, in which case artificial light may be used in conjunction with the daylight.

Coming now to the question of artificial lighting, it is obvious to everyone that most sources are decidedly redder than daylight, with



the result that color discrimination is rendered most difficult, and observations made under such lighting conditions are unreliable. It is, however, quite possible to closely approximate daylight in quality by suitable lighting units, and these should be installed in the operating room. The dentist may then use these to supplement or supersede daylight, and the change will cause no inconvenience. If, on the other hand, a yellowish artificial light is used to supplement the failing daylight, the illumination will be very unsatisfactory and the results uncertain.

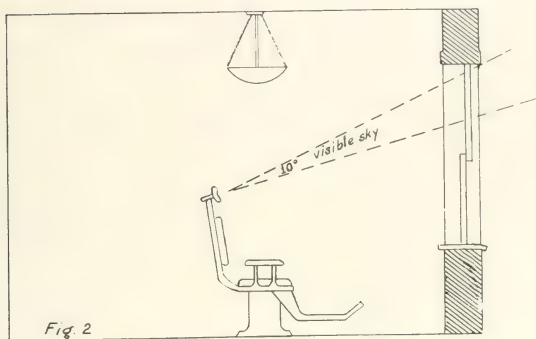
The type of lighting to be used should, if possible, be semi-indirect, with heavy density opal bowl, as this will give the maximum diffusion without glare. Its position in the room is important, for the care of the operator's eyes and the comfort of the patient. It may be taken for granted that anyone working where a lighting source is in the field of vision constantly will, sooner or later, suffer from eye

trouble; therefore, the fixture must be placed outside of the operator's ordinary field of vision when at work at the chair. The light should be of such an intensity as to illumine the room to a degree that will permit of all ordinary work being performed by its aid alone, but it should be supplemented by direct flood or spot lighting for examination of the mouth. There should also be special local lighting provided, in any part of the room which the general lighting does not reach or where special illumination is required. All the lighting in the operating room should approximate as nearly as possible to daylight, and this may be secured by using special daylight units or blue bulb gas filled lamps. The spot or flood light used to illuminate the mouth should be convenient to the chair, easy of adjustment, and correct in color, the latter being particularly important.

The lighting of the laboratory requires some attention, although the demands are much less exacting than those of the operating room. If daylight is insufficient, then general illumination of the room should be provided by a semi-indirect or direct fixture, together with properly shaded local lighting over the work bench. Daylight units should be used where color discrimination is required, as in the matching of artificial teeth. For the examination of radiographs a special light is required, consisting of an opaque box or lantern fitted with a window of diffusing glass, either ground or opal. It will be found that the discrimination of detail will be more readily effected if the light is approximately monochromatic, hence one or more colored screens should be provided for this light.

To give definite information as to the number and size of lamps required to light any particular office is difficult, as conditions vary widely, but some general suggestions may be advanced. Where an alternating current of low frequency is in use, such as the 25 cycle system in Toronto, gas filled lamps should be used exclusively, as these help greatly to mitigate the exasperating flicker so apparent in the metal filament lamps of the vacuum type. If semi-indirect lighting is to be the method employed, then it is important that the ceiling be white, or nearly so, and the walls should not be too dark, say with a reflection factor of fifty per cent. and the color preferably a neutral grey, so as not to give any decided tint to the reflected light.

As a concrete example, suppose the floor area of the operating room is 180 square feet, the ceiling 9 feet high, the color of the ceiling white and the walls medium grey. Then allowing a depreciation factor of 1.3, and assuming an indirect type of fixture of heavy density opal to be chosen, and that daylight mazda bulbs are used, an energy consumption of 600 watts will give an illumination of 8 foot candles, which should be sufficient if supplemented by a spot light. This illumination would be furnished by two 300 watt lamp bulbs, or three 200 watt bulbs. In a room of that size the former selection will gener-



ally prove more suitable. It will be noticed that this works out at 3 1-3 watts per square foot of floor area, so that for a room say 8 feet by 12 feet, with the same color of walls and ceiling, good lighting would be furnished by one 300 watt blue bulb in a similar reflector. The arrangement of this latter room is illustrated in Fig. 2.

## The Ontario Educational Association

BY J. CHATTERIS LIVETT, D.D.S., TORONTO.

**D**URING the highly successful Convention of the Ontario Educational Association, held recently in Toronto, that section devoted to School Health and Physical Education was of particular interest to those members of the dental profession who are engaged in public health work.

It was an excellent opportunity for school dentists, physicians and nurses to meet and discuss the many problems which arise in the conduct of school clinics. The value of such meetings, where methods of procedure can be explained, reports tabulated and reviewed, and constructive criticism offered, is impossible to over-estimate, and it is gratifying to record that the sessions were well attended. There were present the entire dental staff of the Department of Public Health, Toronto, and the following dental officers in charge of clinic centres throughout the province: Dr. J. M. Wilson, Belleville; Dr. W. Manning, Hamilton; Dr. E. W. Fuller, London; Dr. Snelgrove, London; Dr. J. C. Green, Peterboro; Dr. F. J. Furlong and Dr. Biehn of Windsor. These gentlemen spoke of the fine work being accomplished in Public school dentistry in their respective cities, and emphasized the need of extending a service so vitally necessary to the well being of the children. Other very interesting papers were contributed by Dr. A. E. Webster, Dr. Edmund A. Grant, Director of Dental Services, Department of Public Health, Toronto; Dr. J. G. Pilkey and Dr. H. B. Walker, Toronto.

From Toronto, Hamilton, London, Windsor and St. Catharines written reports were received, which are printed in full in the following pages.

In a paper entitled "Suggestions for the Conduct of Public Dental Service for Children," Dr. Webster pointed out that whatever the public knows of dentistry has come from the dentist himself. Due to this teaching, there is an ingrained notion that children's teeth need no attention other than extraction. Dental officers find this an obstacle to the successful dental care of the young.

It is well nigh impossible to lay down rules of procedure or practise that would be suitable for all dental hospitals or school clinics. The equipment, age of the patients and the number to be cared for, must largely govern the procedure. Fortunately, dental practice, for the young especially, gives full value for whatever effort is put forth. In most clinics, all cannot be treated, so the greatest good must be done for the greatest number. Long or tedious treatments cannot be undertaken, no matter how desirable, if by so doing several other teeth are lost for want of care. Experience must be the guide for every clinician as to what teeth must be extracted, filled or treated. Much as a truly conscientious dentist in public service dislikes to remove a tooth for a young patient, yet he may find it necessary to do so in the interests of many others who demand his attention.

\* \* \*

Dr. A. E. Grant regretted that a director of dental services has not yet been appointed by the Provincial Government. This would be of inestimable value in extending dental public health work. By standardizing methods (those which have already proved their worth), equipment and stationery, the expense would be minimized. However, Dr. Grant stated that much good is being accomplished; a surprising interest in school dentistry is being shown by dentists throughout Ontario, and advice and suggestions as to the proper organization of school clinics, correct equipment to instal, etc., are continually sought.

\* \* \*

As it is the earnest desire of every school dental officer to correlate the teaching of dentists, physicians, nurses and teachers, the papers dealing with "Prophylaxis" (Dr. J. G. Pilkey), and the "Theory of Dental Caries" (Dr. H. B. Walker), were particularly timely. Both Dr. Pilkey and Dr. Walker are dental survey officers in the Toronto Public schools, and the opportunity to learn from them the correct method of prophylaxis, and to better understand the causes of tooth decay, was especially appreciated by the Public school nurses, who work in conjunction with school dentists. In the discussion that followed, it was evident that one good method of

cleansing the teeth should be adopted and taught to the children; all others should be excluded, so as to avoid confusion. It is a hard task to instruct a child in the proper use of the tooth brush, but it would be difficult to improve on the method advocated and so clearly demonstrated by Dr. Pilkey.

\* \* \*

Before the session closed, it was proposed that a school dentists' association should be formed, and the following committee was elected: Drs. Grant and Pilkey, Toronto; Dr. Fuller, London; Dr. Manning, Hamilton, and Dr. Furlong, Windsor.

In connection with this association, an important meeting will be held during the convention of the Ontario Dental Association. It is hoped that every dentist interested will make an effort to attend.

In addition to the reports printed below, we are informed that Dr. N. D. Liberty is at present organizing a school dental service at South Porcupine.

\* \* \*

## RESUME AND STATISTICAL REPORT OF SCHOOL DENTAL SERVICES FOR YEARS 1920-1921-1922.

E. W. FULLER, D.D.S., CHIEF SCHOOL DENTAL OFFICER  
LONDON PUBLIC SCHOOLS, LONDON, ONTARIO.

THE department of Dental Service was established in the London Public Schools in January, 1917, with the writer as the dental officer on half-time service. A survey was made of all school children, and it was found that 96% had dental defects. One clinic was opened in a school located in the most needy section. My time was divided partly in examining, partly in teaching Oral Hygiene to the children, and the balance at the clinic. The demand for dental services, at that time, was not keen, few parents being anxious to take advantage of the service for their children. In a few months, however, applications for treatment began coming in rapidly, and I carried on as best I could until 1919, when the School Board was asked to appoint an assistant. This they did, appointing Dr. S. A. Moore, which helped matters for awhile. Then the Board was again appealed to for another assistant, which they granted early in 1922, and Dr. J. F. Giffen was added to the staff. It was impossible to keep pace with the demands for dental service, and again the Board was appealed to, they appointing a third assistant, Dr. C. M. Snelgrove, who began duties in March of this year—1923. The three clinics are literally besieged with applications for treatment at the present time.

It is gratifying to have watched the rapid growth. There has been

little or no destructive criticism from any quarter—the School Board, the School Inspectors, the School Teachers, School Nurses, in fact all who are in any way connected, have co-operated, so as to put the Dental Department of London Public Schools on a firm foundation.

All children are examined once a year, all defects being reported to the parents, advising them to take their child to their family dentist. Those who cannot pay, for any reason (chiefly financial), or those who will not do so, we are anxious to take care of in the schools, for we do not believe that any child should suffer either through inability to get services from a private dentist, or through wanton neglect. After examining, a talk of fifteen or twenty minutes is given in every class-room, telling children why they should have clean mouths and showing them how,—(demonstration of the use of a tooth-brush).

The school nurses follow up the results of the examination and make all appointments for children who are to go to the school dentists. When a child is accepted at a school clinic, we aim to put his or her mouth in a thoroughly healthy condition, doing the best work we possibly can, and doing all the work that is needed. If it is possible without too much strain on the child, we do it all at one sitting, but the child is always taken into consideration. We do not wish our clinics to become dental mills, but rather we would have the child feel he has left a friend behind in the person of the school dentist, when he leaves the clinic. In 1920, we treated 492 patients, with total operations of 3,320; in 1921—603 patients with total operations of 4,294; in 1922—1,000 patients with 6,037 operations.

There has always been a great deal said about the destruction of the sixth year molar, and the consequent havoc caused by its loss. My observation led me to believe that the more frequent destruction and loss of the second deciduous molar was causing more havoc with the second dentition. The writer planned a card to give some accurate statistics regarding both the sixth year molar and the second deciduous molar, also the child's ability to masticate, the proportion of children receiving dental care, the number suffering with pain, the number of children with mouths in "O.K." condition and the number with dental defects. When this card was planned it was not the writer's intention that the results should be made public, it was purely for personal satisfaction and to see if it would give some light as to the best way of conducting our Dental Department. Since then, it has occurred to me that the results might be interesting and possibly beneficial to other dentists interested in this work.

To my knowledge, no one has ever gathered information of this kind.

The following is the tabulation of the results covering 1920, 1921 and 1922, enumerating the different divisions, and also showing the percentages of same. In order to have some idea of the conditions

Year	Year 1920	%	% of Kindergarten	% of Grade 8	Year 1921	%	% of Kindergarten	% of Grade 8	Year 1922	%	% of Kindergarten	% of Grade 8
PUPILS EXAMINED												
MASTICATING EFFICIENCY:	5,501				6,374				7,737			
Good.....	1,478	26.8	34.0	47.9	1,824	28.6	41.2	48.6	2,195	28.6	36.7	50.5
Fair.....	2,590	46.8	42.2	38.4	3,187	50.0	36.9	42.4	4,074	46.8	44.5	41.5
Poor.....	1,278	23.2	20.4	10.7	1,218	19.1	19.4	7.5	1,262	16.3	15.6	7.0
Bad.....	155	2.7	3.2	2.0	145	2.3	2.6	1.5	206	2.6	3.4	.9
TREATMENT:												
Receiving treatment.....	1,552	28.3	10.4	52.1	2,219	34.8	10.0	58.7	3,148	40.05	11.9	67.4
Not receiving treatment.....	3,949	71.7	89.6	47.9	4,155	65.2	90.0	41.3	4,589	59.5	88.1	32.6
PAIN:												
Suffering pain.....	966	17.5	13.5	15.0	884	14.0	20.3	6.2	1,003	12.9	29.7	5.0
Not suffering pain.....	4,535	82.5	86.5	85.0	5,490	86.0	79.7	93.8	6,734	87.1	72.3	95.0
SIXTH YEAR MOLARS:												
Number examined.....	19,907				21,578				27,600			
Abscessed (acute).....	70	35		5	64	29		5	74	26		3
Need extracting.....	769	3.8		7.3	953	4.4		8.0	969	3.5		6.4
Cavities involving pulp.....	727	3.6		6.0	838	3.8		5.2	825	2.9		4.3
Small pit and fissure cavities.....	5,270	26.4	18.9	22.3	4,546	20.6	14.8	15.2	4,439	16.1	8.0	14.0
Large cavities.....	2,010	10.0	4.4	13.4	2,371	10.9	7.6	12.6	2,579	9.3	3.1	10.8
Roots only in position.....	150	7		2.1	218	1.0		2.9	197	7		2.2
Missing.....	241	1.2	76.5	3.9	436	2.0		3.9	647	2.3		5.6
Sound or filled.....	12,236	61.5		58.2	14,007	64.8	77.4	65.1	19,738	71.5	88.9	67.6
SECOND DECIDUOUS MOLARS												
Number examined.....	13,430				14,040				16,307			
Abscessed (acute).....	702	5.2	3.2		757	5.3	2.8		915	5.6	2.5	
Need extracting.....	2,984	22.0	7.1		3,394	24.2	6.2		3,389	20.7	5.6	
Cavities involving pulp.....	1,789	13.3	8.8		1,270	9.0	8.5		1,542	9.5	7.8	
Small pit and fissure cavities.....	1,110	8.3	18.5		1,036	7.4	18.7		1,368	8.4	19.2	
Large cavities.....	4,323	32.2	28.9		4,692	32.5	26.5		4,926	30.1	25.9	
Roots only in position.....	1,400	10.0	3.6		1,408	10.0	2.4		1,229	7.5	1.4	
Missing.....	2,010	14.6	2.3		1,282	9.3	1.2		1,908	11.1	1.1	
Sound or filled.....	4,587	34.2	46.5		5,622	40.0	50.9		6,878	42.2	52.4	
CHILDREN WITH MOUTHS IN "O.K." CONDITION												
.....	1,060	19.3	19.4	26.6	1,672	26.2	21.2	38.8	2,398	30.9	20.1	44.4
CHILDREN WITH DENTAL DEFECTS												
.....	4,441	80.7	80.6	73.4	4,762	73.8	78.8	61.2	5,339	69.1	79.9	55.6

of the children's mouths on entering school and also before leaving school, the tabulation includes the percentages for the different divisions for the kindergarten and Grade 8. As this examination is made at the beginning of the year, and as Grade 8 children are usually willing to have defects remedied, they would be in a much better condition on leaving school one year later.

Regarding the preceding tabulation, attention is directed to several points. The examination was almost entirely conducted by the writer, so that it is consistent,—two examiners might not mark in the same manner. It will be seen that there is a gradual improvement each year. With few exceptions, the percentages that should go higher have done so, and likewise those that should go lower have done so. It is interesting to note that the conditions in both the kindergarten and Grade 8 are considerably better than the average in nearly every division, showing that there is a stage between entering and leaving school, when children's mouths are at their worst from a standpoint of dental disease.

"Masticating Efficiency" was divided into the four sections as shown—good, fair, poor, and bad: "Good" showing that a child could masticate thoroughly; "Fair" that they might masticate to an extent; "Poor" that they would have slight chance of masticating, and "Bad" that there was no possibility of masticating. The percentage under "Good" is noted to be comparatively small, particularly the percentages taken from the total examined.

Under "Treatment," those "receiving treatment" include both those under the care of either private or school dentist, and "not receiving treatment" infers that the child was not under the care of a dentist in any way, except perhaps, for the relief of pain.

Under "Pain"—"suffering pain" refers to those who had toothache periodically at the time of examination.

Under the "Sixth year molars" and the "Second Deciduous Molars" the divisions are self explanatory, but attention is directed to the contrast between the two, particularly the comparatively large number of "sound or filled" sixth year molars, and the small number of "missing and badly diseased ones," with the much smaller number of "sound or filled" second deciduous molars, and the great number of "missing and badly diseased ones."

"The children with mouths in O.K. condition" are children whose mouths were perfectly healthy and had no dental defects present, their teeth were naturally immune to dental disease or they had all defects remedied previous to the examination; while no matter how small a dental defect a child had, they are classed as "Children with dental defects."

## DEPARTMENT OF PUBLIC HEALTH, TORONTO.

ANNUAL REPORT OF DENTAL SERVICE, DEPARTMENT OF  
PUBLIC HEALTH, TORONTO, 1922.

EDMUND A. GRANT, D.D.S.

*Director Dental Services, Department of Public Health, Toronto.*

**D**URING the year 1922, the Department of Public Health conducted eighteen operative clinics and four extraction centres in the Public schools, five clinics in the Separate schools, also clinics in the out-patient departments of the General, St. Michael's, Grace, and Western Hospitals. This work was carried on by a staff of thirty-five dentists on half-time duty, under a director of dental services.

Every child is examined once a year and a report of the mouth conditions found is sent to the parent. This is of great value, as parents are thus kept informed of the changes which may occur so rapidly in the developing child and sometimes warned of serious dental disease before irreparable damage is done. Realizing that prevention is of most value, the dentist, in his talks to the children on the anatomy and hygiene of the mouth and teeth, teaches the relation of diet to the teeth, approved methods of brushing, and the importance of their care. This instruction is followed up in the health lessons given by teacher and nurse, so that the school child of to-day has a very creditable knowledge of these most important matters. This is shown by their written essays, clever drawings and posters.

The work accomplished in 1922 is briefly summarized in the following figures:

*Summary of Work of Dental Service, for Year 1922, in Public and  
Separate Schools.*

Number of children examined .....	73,581
Percentage found with dental defects .....	42,378 or 58%
Number of children treated .....	38,399
Number of children completed .....	21,851
Deciduous teeth extracted .....	33,831
Permanent teeth extracted .....	3,191
Local anaesthetics .....	10,256
General anaesthetics .....	1,567
Treatments .....	23,482
Prophylaxis treatments .....	5,685
Amalgam fillings .....	24,223
Oxyphosphate of zinc fillings .....	2,710
Oxyphosphate of copper fillings .....	9,871
Temporary and other fillings .....	5,318
Total number of fillings .....	42,122

*Note.*—These figures include work done in summer clinics conducted during the holidays, in two Public schools, St. John's Indus-

trial School, the Sunnyside Orphanage, the Preventorium, and Victoria Park and High Park Forest Schools.

No school dental service could hope to overtake its problem without some supervision of the child before entering school, from at least three years of age. That prenatal conditions also are most important is evidenced from the fact that the first teeth commence to develop about six months before birth and the permanent teeth about two or three months before birth. At seven years of age this development, while not complete, has proceeded so far that improvement in the tooth structure is much more difficult to effect. This service, therefore, endeavors to co-operate with the prenatal and child welfare division of the department, through talks to mothers on the importance of diet in its relation to the teeth through this early period. Twelve of these talks were given during the year.

One half-day per week is also reserved in each clinic for pre-school children. The advice given to mothers, as to care of children's mouths, is followed by early treatment when necessary. It is safe to say that, with proper dietetic habits, and monthly visits to the dentist for prophylaxis treatment, that development of dental caries could be prevented.

#### *Summary of Work in Hospital Dental Clinics.*

Number of patients treated .....	15,492
Extractions .....	14,170
Local anaesthetics .....	2,637
General anaesthetics .....	944
Treatments .....	1,789
Amalgam fillings .....	271
Cement fillings .....	324
Temporary fillings .....	373
Full dentures .....	869
Partial dentures .....	800
Repairs to dentures .....	295
Reset dentures .....	47
Crowns .....	13

This report includes work at the Women's College Hospital and the Industrial Refuge.

An important decision as to hospital dental service was made by Dr. Hastings towards the end of the year. Believing that the work of his Department is educational and preventive, and that hospital dental service had been undertaken simply to demonstrate to the hospitals the value and necessity of a dental department, he felt that as this work had been carried on for a number of years by his Department, the hospitals might fairly be asked to assume the responsibility. He therefore made the following recommendation to the Hospitals Commission:

That, as the dental clinics established and conducted by the Health Department in the various city hospitals had fully demon-

strated the necessity of this particular service; and further, inasmuch as the time has now come, in the light of modern knowledge, when Hospitals and the medical profession generally, fully appreciate the important role played by defective teeth, diseased teeth and gums, so far as diseased conditions of the body generally are concerned, and also as an aid to diagnosis, and that, consequently, this should, in his judgment, constitute essentially a part and parcel of the general routine clinic teachings and administration of every hospital, just as positively so as do the special branches of eye, ear, nose and throat, etc. The Hospitals Commission fully concurred in this opinion, and, as a result, the hospitals were requested to take over this work and organize it as a part of their clinical administration, and thus relieve the Department of Public Health of all responsibility in connection therewith; this transfer of responsibility to date as from December 31st, 1922.

The Department, however, carried on till February 15th, 1923, in order to give the hospitals sufficient time to organize their own service. It is gratifying to note that they all decided to continue the dental service.

The Department lost the valued services of Drs. W. W. MacDonald, G. S. Murray and R. W. Hoffmann, who resigned to devote all their time to private practice. Drs. J. M. McLeod, J. C. Livett and R. M. Freestone were appointed to the vacancies, and the Separate school staff was increased by the addition of Dr. J. F. Porter. The success of the year's work is entirely due to the loyal co-operation and faithful service of the entire staff. Dentistry for children is most exacting work, and the man who carries it on successfully the year round in a public service, where the financial rewards are not equal to those of private practice, must be animated by a love for children and a sincere desire for the higher forms of service.

The work covered in this report represents a contribution to the welfare of the community which would be hard to value in dollars and cents, but those who are in daily touch with school life and see the improvement in mouth conditions and general health, bringing an increased self-respect and keener mental effort, consider it as something more than worth while.

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## REPORT CITY OF HAMILTON.

To James Roberts, Esq., M.D.,  
Medical Officer of Health.

Sir,—In presenting the first annual report of the Health Centre Dental Clinic, it will no doubt be gratifying to note the great amount of work which has been accomplished here during the first year.

In this connection it might be stated that there was no dental survey of the schools, from which children come to this clinic, made until October, so that the results of this are scarcely noticeable in this report. When this is taken into consideration, it shows that we are getting very good co-operation from parents and all those connected with this work, and their assistance is greatly appreciated.

This clinic, which is situated at the Health Centre, is open every school day from 9 to 12 a.m., and from 1.30 to 5 p.m.; also Saturday morning, from 9 to 12 a.m. The children who come here for treatment are from the fourteen Separate schools situated throughout the city, and four public schools which are in this vicinity. In addition to children of pre-school age, deserving adults are looked after.

The inspection which was recently made of the 5,655 children under our jurisdiction showed that there were 4,766, or 83 per cent., requiring treatment. Since the parents' notification cards have been sent out, there have been a great number apply for treatment, and the result of this should be very noticeable later on. The parents are taking a greater interest in the children's teeth, and indirectly in the children's health, as there is no doubt that the former has very much to do with the latter, and parents are realizing this more than ever.

Below please find detailed report of the year's work done in this clinic:—

Total treatments .....	5,675
Total extractions .....	2,834
Fillings:	
Amalgam (silver) .....	1,821
Synthetic (enamel) .....	325
Copper cement .....	2,956
Petroid cement .....	90
Gutta percha .....	1,322
Root fillings .....	240
Silver nitrate .....	367
Pulp removed .....	79
New cases .....	1,889
Completed cases .....	1,192
Gas cases .....	60

#### *Dental Survey of Schools.*

Public schools .....	4
Separate schools .....	13
Total number of children inspected .....	5,655
Total number of children requiring treatment .....	4,677
Percentage requiring treatment .....	82.706%

Respectfully submitted,

J. E. DORES, D.D.S.

J. L. STEWART, D.D.S.

## REPORT OF DENTAL CLINICS.

*In King George and Caroline Street Schools, for the Year ending  
October 31st, 1922.*

To James Roberts, Esq., M.D.,  
Medical Officer of Health.

Sir,—During the past year the requests received for dental treatment in the school clinics have increased greatly, which is indeed a favorable indication of the interest which is being taken in the work of the clinics.

In reviewing the past year's work, which has just been completed, with general survey of all the schools, it is very gratifying to those in charge to find but fifty-six per cent. of the pupils requiring dental treatment. While this may seem a large percentage of defectives, when one considers that our survey two years ago showed over eighty per cent. of the children in need of dental treatment, the improvement is great, and proves that our work in the schools and dental clinics has been very much worth while.

During the course of the past year the two clinics, on half time, have given treatment to four thousand children.

This means that another four thousand have been treated by their family dentist, as advised during our examination.

Admirable as the increase in school dental service may be, we must strive to popularize preventive dentistry. Our children may leave school with healthier mouths, but unfortunately they are not coming into the schools with fewer cavities to be filled by the school dentists, as our records show. To overcome this, the public must be educated, or our dental facilities increased to care for the children of pre-school age.

The key word to "prevention" is "education," and the prejudice and ignorance handed down must be counteracted by education. Parents must be aroused to the realization of the importance of the first teeth, of the six-year molars, and of all the cardinal points of dental health. It might be suggested, in striving for this objective, that more emphasis be laid on this subject in the Normal schools and the training schools for public health nurses.

Wisdom teaches to cure evil at its source. Prevention with children is much better than cure with adults.

Below is submitted a detailed report of the year's work:—

Total treatments .....	6,542
Total extractions .....	4,120
Fillings:	
Amalgam (silver) .....	2,807
Petroid cement .....	1,198
Copper cement .....	1,571
Enamel (synthetic) .....	232

Gutta percha .....	2,775
Temporary .....	232
Silver nitrate .....	4,481
Miscellaneous operations .....	571
New cases .....	3,280
Completed cases .....	2,464
Dental inspection of 18,553 pupils.	

*Individual Statement of Each School Surveyed, 1922.*

School.	Number inspected.	Number requiring treatment.	Percentage requiring treatment.
Central .....	476	231	48
King Edward .....	415	295	71
Allenby .....	410	240	58
Murray .....	237	165	65
Cannon .....	312	163	52
Ryerson .....	582	302	51
Earl Kitchener .....	788	440	56
Bennetto .....	1,010	671	66
Hess .....	722	491	68
Strathcona .....	820	520	63
Caroline .....	350	150	42
Prince of Wales .....	875	499	55
Gibson .....	960	602	62
Wentworth .....	720	401	55
Lloyd George .....	585	301	51
Queen Mary .....	945	501	53
Fairfield .....	450	220	48
King George .....	945	421	44
Memorial .....	1,400	600	42
Adelaide Hoodless .....	965	405	41
Robert Land .....	1,020	721	70
	14,897	8,339	55%

This report shows a vast reduction in the number of children requiring dental treatment, due, not only to the increased number cared for in the clinics, but also the interest stimulated by the annual survey of the children when a report is sent to each and every parent informing them of any dental defects in their children.

That this advice is acted upon is evident from the continually improved condition found annually upon inspection.

Respectfully submitted,

W. G. MANNING, D.D.S.

H. A. THOMPSON, D.D.S.

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A REPORT ON DENTAL WORK CARRIED ON IN THE  
PUBLIC SCHOOLS OF ST. CATHARINES.

This work was commenced on April 1921. Since that time three surveys have been held. As the card system at the previous surveys was not completely satisfactory, we used the one recommended by the Department of Education at the last survey and can therefore give you a detailed account of it.

The staff on this work is as follows:—

One Dentist—Working three hours per school day.  
 One Medical Nurse  
 One Lady Assistant } Give part time to this work.

The results are as follows:—

Total number of pupils on roll in September 1922 . . 3,004  
 Total number of pupils examined at survey, Sept.  
 1922 . . . . . 2,673  
 Total number of cards returned of those with no  
 defects . . . . . 139  
 Total number of cards returned which have been  
 signed by family Dentist . . . . . 228  
 Total number of cards returned asking for treatment  
 (including those completed to date) . . . . . 1,173

*Note:* Only about 87% of pupils were actually examined, there being some absent at all Schools during the Survey; also, a few avoid the survey. Of those examined, data can be obtained only from cards returned.

Of 2,673 examined, 195 shewed no defects by the counter-foils, that is 7.2% of those actually examined.

The above figures shew that out of 2,673 examined, only 1,540 cards were returned, therefore there are 1,133 cards missing.

Of these 1,540 only 139 shewed no defects. 228 signed by family dentist as complete.

In each class room as the Survey was completed, a short talk was given on Dental Hygiene and an effort made to get the co-operation of the teacher.

*Remarks:* 1,173 asked for treatment. Possibly one-third of these may be eliminated by inquiry into their neediness, leaving 782 who should receive attention.

We usually complete about eight (8) cases per week; therefore during school year, which is forty (40) weeks, deducting ten weeks for survey, the total number completed would be 240. This shows the work to be about three times what one Dentist can attend to in one half day.

This would be further increased if "Follow-up-work" could be done by a Nurse to get in the remainder of the cards, (chiefly those of the more ignorant class who need teaching as to the value of the Dental Clinic to them).

There is need of much more "Follow-up-work"—1st. To get cards all returned, which would shew a large increase in demand for Clinic work. 2nd. To look into cases, which these cards represent and to find out if they are unable to pay for their own dentistry.

Signed: RICHMOND H. ATKEY,  
 School Dental Officer.

## REPORT CITY OF WINDSOR, ONT.

The Separate School Board of Windsor opened a Dental Clinic in their Schools in the fall of 1921. It was of the itinerant class and practically no records were kept. In September, 1922, I was appointed Dental Officer for the Separate Schools here and made arrangements with the Board to establish a centralized School Dental Clinic. This was done immediately. Our method of operation is as follows:— An inspection of the children attending the various schools is made by the Dentist and cards are issued to the children receiving Dental treatment, and on these cards is printed a request for the work to be done by the family Dentist, but if the parent or guardian wishes the work to be done at the school Clinic, a space is left for this request, and when the card is returned the child is give a permission card for the parent to sign. When this is done, appointments are made.

My time spent at the Clinic is 5 half days a week (mornings), and since the opening of the Schools last September, the following work has been done.

School children inspected and cards issued . . . . .	2,157
Amalgam fillings (permanent teeth) . . . . .	302
Copper Cement fillings, Permanent and deciduous teeth . . . . .	248
6 year Molars (pulp caps) . . . . .	19
Treatments (stop toothache) . . . . .	14
Prophylaxis . . . . .	260
Extractions . . . . .	592

Up to April 1st, 1923, we did not keep a record of the number of permanent and temporary teeth extracted, or whether an anaesthetic was used. We are doing so now, however.

Silicates . . . . . 10

We found from our school inspection that about 96% of the children needed Dental treatment of some kind.

Signed:

F. J. FURLONG.

## Extracts from Paper and Clinic Presented at the April Meeting of the Winnipeg Dental Society

BY FREDERICK E. WARRINER, D.D.S.

**M**R. CHAIRMAN and fellow members of the Winnipeg Dental Society. Our executive honored me when they requested a paper and clinic on Prosthetic Dentistry. As my time for several years has been devoted almost entirely to the construction of

Artificial dentures and removable bridge work, the thought occurred that by relating some of my experiences I might further the good work of the Society and incidentally reap a reward myself from the discussion which usually follows an effort of this kind. Just as open confession is good for the soul, so friendly constructive criticism is especially good for all who take part.

Let us turn our attention for a few minutes to Re-lining or Re-basing full or partial dentures.

*Re-lining*, as we understand it in our office, means adding new rubber to a denture as a means of tightening the fit or of restoring the articulation as in a lower partial which has settled considerably.

*Re-basing* means all this and more. Here not only is the proper fit and articulation restored, but all the old vulcanite is removed and new rubber is inserted.

*Service First.* Now if one keeps the idea of *service first* in the foreground of their dealings with their patients, especially in these times of financial stress, it becomes imperative, it seems to me, to understand this technique and practise same.

*For Example, let me cite a case.*

Mrs. A., in very moderate circumstances has two first upper molars to be extracted which for years have served as retention for a partial gumless, ill-fitting denture. We have every reason to expect a slow continual shrinkage, especially when pressure is applied through mastication on areas heretofore unused.

*Bear in Mind.*

This denture when molars were extracted was absolutely useless. The patient needed teeth for appearances. A new denture might have been rushed through, but the time required, the additional expense, the doubtless result of this method as compared with the method used, does not justify it in my mind.

It is a peculiar trait in nature, but nevertheless true, that a temporary denture can and often will be worn for years in comfort and with success, while on the other hand, had it been labeled permanent either by us or by the patient, all manner of inconveniences would follow in its wake.

In this particular case the gum had shrunk a considerable distance in the front, leaving the Anteriors suspended in mid-air, so to speak. Immediately following the extraction of the molars, I had patient insert the denture and close her lower teeth against it, thus insuring its usual position. With a strip of softened compound I proceeded to make a compound gum on the denture extending as far posteriorly as possible, frequently working the lips and cheeks to show the action of the muscles. As soon as this compound hardened I removed and with hard sticky wax sealed any weak spots to the den-

ture. After drying the plate I postdamed in the usual way, finishing my impression by using this whole as an impression tray and inserting a coat of soft plaster, after which it was turned over to the mechanical department to make the necessary additions and finish. Time consumed 20 minutes. Only one adjustment of a minor nature has been required since, i.e., a slight relieving on the periphery at one point.

#### *Result.*

A satisfied patient at a minimum cost, and no responsibility at a time when you have a changing foundation over which you have no control and with which you must contend.

#### *Second Type.*

Upper denture we say presents itself. Teeth apparently articulate correctly with lowers when mouth at rest, but rocks at other times, is more or less loose, or perhaps it is a new denture you have just had finished. You naturally blame the Laboratory man, and he tells you or he tells himself that if your impression had been O.K., there would be no difficulty. However, the point is, what is to be done to satisfy the patient,—to do justice to yourself.

#### *One Method.*

With a large plate bar, cut away most of the rubber on the palatal side of denture, especially at the point of rocking, check up your periphery for leaks, and then with thin plaster about the consistency of thickened cream, and using the denture as an impression tray, proceed as before. Often advantageous to have a small hole cut with a bur in roof of denture for the escape of surplus plaster.

#### *Third Type—(A Modification of Second).*

Patient wearing old upper denture with narrow sides, short in length, appearance and articulation good. Denture loose, especially when eating.

Here roughen periphery with bur, thoroughly dry, and with compound stick proceed as in case of Green Supplee method of impression taking. Seldom do we use plaster for this type.

#### *The Fourth Type or Expectant Type.*

Here we have that class of patient who dread the change in appearances, abhor the very thought of anything removable in the mouth, and will fight to the last ditch to save the worst looking, evil smelling, pus-producing fang that nature gave them; who recall vividly to mind all the poor cases they have seen of ill-fitting, horrid looking, ever-dropping dentures, or still worse those worn on the mantel or dresser or carried in the hip pocket.

They vividly picture in their own minds their future with sunken cheeks, wrinkled lips, the hot potato form of speech *ad infinitum*, and become nauseated whenever plates are mentioned.

Here is the chance for a dentist to show his worth. To rise above

all these obstacles, to overcome these difficulties and prejudices, one must be far in advance of street car illustrations and newspaper advertisements as they exist today.

This presents a picture where estimates cease to exist. Here the esthetic and artistic side of our profession, which is only in recent years coming to the front, is called into play.

Several years ago we had a notable patient of this type, willing to pay and able to pay for every kind of service that would overcome these difficulties as he saw them.

We had advised removing all the upper teeth. He had reached the point where his physician agreed with us that his teeth were undoubtedly undermining his health.

He remained obdurate and skeptical until he had visited several notable and leading diagnostics in the larger cities to the South. Fortunately they agreed with our findings and concurred in our diagnoses. When he returned and told us he wanted us to do the work, believe me, I did not know whether to be glad or sorry.

Briefly let me state the different stages followed in this particular case that terminated in success, and let me assure you any constructive criticism will be heartily welcomed.

I. Models were made of his mouth with all the teeth in place.

II. The posteriors were extracted.

III. Inlays with Roach attachments were placed on the cuspids.

IV. A bar denture was here made as soon as mouth healed, and in time was worn successfully.

V. About six months later a small vulcanite stringer was added to the bar and teeth lengthened.

VI. Before extracting anteriors we added enough vulcanite to completely cover the palate.

VII. When this became comfortable an impression was taken including Anterior teeth which were cut off the model and added to denture. The teeth were as good an imitation in color and shape as possible for us to get, and contained fillings similar to his own teeth.

VIII. Before teeth were extracted, another impression was taken and into this extracted teeth were inserted. The plate was immediately put into position and the patient told not remove it for 24 hours.

This denture was not added to until after a new denture, having gum on the front, had been made and worn comfortably.

In conclusion let me say that this patient says his friends do not know he wears artificial teeth. The change has been so gradual that he has no vivid recollection of the change, is able to masticate well, is perfectly satisfied and has paid for all the time and service rendered. And yet from all outward appearances his plate is no better than others who never cease lamenting the loss of their old fangs.

## The National Curse of the Drug Traffic

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FEW problems have been engaging the attention of practically all civilized nations for the past ten or twelve years more than that of the narcotic drug addict. This is not surprising to those who have a knowledge of the exhilarating and yet soothing effect of these drugs. Undoubtedly our present so-called civilization is at least in a measure responsible. It is not the plegmatic that becomes the addict but rather the plethoric, those of a highly sensitive and excitable, nervous temperament. Once they experience the wonderful relief afforded by the drug, giving them immunity against the stress and worries of life, they are very likely to repeat the panacea and then the habit is gradually formed, so gradually, that before they know its terrors they are imprisoned.

Furthermore, the tendency of our present civilization has been to transfer the burden of the bread winner from the muscles to the nerves. The daily duties of the individual have become much more routine and consequently much more monotonous and irritating. Hence there is the greater prevalence of neurasthenia. To this may be added the stress and strain of the keener competition in business, resulting in more or less nervous irritability and brain fidgets that revel in the relief afforded by opium, morphine, heroin and cocaine.

For several years the people of the United States, the home of the neurasthenic and neurasthenia, have been awake to the impending dangers of the habit-forming drug and the drug addict. The American Medical Association and the American Public Health Association some years ago appointed a committee to make all necessary investigations as regards the magnitude of the problem and to ascertain to what extent it was jeopardizing the people. The facts obtained as regards the rapid growth of the evil more than warranted the reappointment of this committee year by year.

Inasmuch as opium-smoking and opium-eating originated for the most part in China and India, it is gratifying to note that recently, through mutual agreement, the exporting of opium from India to China has been enormously reduced, and the production of opium in China has been correspondingly reduced, so that they are endeavoring to get this menace under control.

We have heard a great deal at times about Great Britain's poisoning the people of India with opium. We have had the good fortune within the past few days to have had a visit in connection with Infant and Child Welfare Work from a physician who has been a missionary in India for over twenty-one years. When asked about the opium traffic in India, he said that the drug addict in India was practically unheard of. The drug was used to a greater or lesser

degree, but in the vast majority of cases in a manner corresponding closely to the use of tobacco in our country. They had excellent laws and these laws were observed. They had certain shops where opium could be purchased. These were licensed shops, not dens. They have no dens. This statement, as well as that of the Royal Commission appointed recently to investigate conditions in India in regard to the opium traffic, were all to the effect that the drug was used in great moderation, and there was little or no evidence of ill effects from its use. Of course, in India the crude drug is used, and is either eaten or smoked. In fact, the users of opium in all countries are divided into three classes—the opium eater, the opium smoker, and the morphine injector. Until recent years, in India and China only the crude drug was used. However, to the discredit of our own country, but probably more especially of the United States, the alkaloids, that is, morphine and heroin, have been exported to China and have gained such inroads that many of the opium smokers have abandoned that as being altogether too tame, and have been for some time resorting to the injection of morphine.

Contrary to the general belief, the amount of morphine obtained by the opium smoker is very small indeed. It has been amply demonstrated that in smoking an opium mixture containing 8.98 per cent. of morphine, 7.63 per cent. was left in the ash or dross, and only 1.35 per cent. of the morphine was carried over in the smoke. One can readily see how much more disastrous will be the use of the alkaloids by hypodermic injection, as is now being adopted in China as well as on this continent and in Europe, than the smoking of crude opium.

Another feature of the problem with which we are confronted, making it much more serious than it has ever been in India and China, is the fact that in those countries the use of opium is for the most part confined to those in middle life and in advanced years, while the users of morphine, heroin and cocaine on this continent, in the vast majority of cases, range from 10 to 12 to 30 or 35 years of age. In fact, there are probably no other countries in the world that are being more jeopardized by drug addiction than are Canada and the United States.

Some conception of this may be had from the comparative annual consumption per capita of morphine in six European countries and in the United States and Canada. In these six European countries it ranges all the way from half a grain in Austria to three grains in France and England, per capita per annum, while in the United States, and no doubt to a corresponding degree in Canada, the per capita consumption is from 35 to 40 grains per annum. This is largely due to lack of knowledge, lack of education, lack of understanding regarding the unmistakable danger of trifling with these drugs, and of the vicious designs of these, the vilest of all criminals in any land, the

drug pedlar and smuggler. It is obviously essential that we have a well-organized educational campaign to inform the general public, the courts, and the medical profession of the fact that the drug addict is a man diseased, suffering from pathological conditions produced by the drug of which he has become a victim, quite as much as is the victim of typhoid fever, who is suffering from the pathological condition brought about in his system by the typhoid germs and their toxins.

It is regrettable to note that we are yet so ill-informed, so primitive, so barbarous, as to treat many of these cases in our courts and jails, instead of having them promptly placed under proper medical and hospital care. The cure of the drug addict is in the hands of himself and his physician. The pathological or diseased condition that has been produced in his body must be restored to normal, and his will power re-established. Consequently, the addict must be kept under constant supervision, so isolated as to make it absolutely impossible for him to get access to the drug he craves during the entire period of its withdrawal. He must not only receive it only with the consent and knowledge of his physician, but it must be administered to him. There is still a difference of opinion in the medical profession as regards the immediate and absolute withdrawal of the drug or the gradual withdrawal. We feel, however, that every case must be treated on its merits. When there are complications of heart and kidney or lung, obviously the withdrawal should always be gradual.

While a large number of the physicians on this continent prefer the immediate withdrawal, yet the gradual withdrawal seems to us a bit more humane. Professor Dixon, Fellow of the Royal College of Surgeons, in an exhaustive address to the Pharmaceutical Society of Great Britain on the Drug Habit, in referring to treatment, said:—"It is generally agreed by those best fitted to give information, in Great Britain at least, that the proper treatment is—First: Custodial care. Second: Gradual withdrawal of the drug, extending over a week or ten days. Third: Free purgation. Fourth: The administration of atropin or hyoscin, when indicated."

"By these methods of treatment," says Professor Dixon, "the patient can usually be discharged in six weeks, in an excellent physical condition." Continuing, Professor Dixon points out that the great question would arise: "Can we control character, convert weakness into strength, so that temptation will disappear?" It must be remembered that the escape from temptation must be through self-control, not through control by others.

The So-called ambulatory treatment is universally condemned. By the ambulatory treatment, we mean the prescribing of the drug for the addict in gradually reduced doses, leaving this to his judgment. This is obviously so unscientific and so hopeless, that it should be prohibited by law.

## THE PROBABLE EXTENT OF THE EVIL.

It is difficult to obtain accurate or reliable statistics, inasmuch as they can only be approximate and based on the amount of the various drugs imported and also on isolated local intensive investigations. The spectacular piece of work done by the New York Department of Health is perhaps the best example of local intensive work, inasmuch as they, through their system of registration, demonstrated that there were 10,000 in New York who were anxious to be relieved, and voluntarily registered in order to be treated by the New York City Department of Health. However, the treatment of these cases was not a success, inasmuch as it is alleged that from 90 to 95 per cent. of those released relapsed soon after their release into their old habits.

It is well worthy of note in this connection that it was found in the majority of cases that representatives, agents from the underworld engaged in the narcotic drug traffic, were lying in wait for these parties, and in many cases even gave them the drug in order to get them back into the habit.

Dr. Copeland, Commissioner of Health for New York City, stated, at a recent conference of the American Public Health Association, that in 1919, the United States imported 546,000 pounds of opium; and, notwithstanding all the investigations and the facts revealed as regards the magnitude of this problem and the extent to which it was jeopardizing the people of the country and how rapidly it was spreading, in 1921, there were 640,000 pounds or 50 grains for every man, woman and child in the United States.

Judge Collins, of New York City, addressing the same conference, said that there were at least 40,000 addicts in New York City, and that would mean that there must be well over half a million in the United States. We are told that we have 10,000 in Canada. We hope that that is all!

As we have already pointed out, the possible sources of information in connection with this traffic are very vague. We would not be surprised to learn that we have between 20,000 and 30,000 and it is spreading rapidly. It is important that we should not wake up and find ourselves dwelling in a fool's paradise. We may just as well face the facts at once, that the conditions that exist in the United States, exist here. It is only a matter of degree. When we read of the enormous number of children in the schools of the United States that were undernourished, underdeveloped, and the percentage of mentally subnormal-children in the various schools, we were amazed; but when we made our own surveys in our own schools, we found practically the same percentage of both the undernourished child and the mentally sub-normal.

The following figures, for which we are indebted to the Federal

Department of Health at Ottawa, represent the amount, year by year, of opium, morphine and cocaine imported into Canada from 1910 to 1922, inclusive:—

Year	Opium lbs.	Cocaine ozs.	Morphine ozs.
1910 .....	3,576	....	....
1911 .....	3,892	....	....
1912 .....	5,017	35	400
1913 .....	5,117	248	2,035
1914 .....	4,438	1,028	4,487
1915 .....	7,248	50	259
1916 .....	1,741	5,381	15,495
1917 .....	15,423	7,051	52,213
1918 .....	12,471	4,705	27,520
1919 .....	34,263	12,333	30,087
1920 .....	13,626	6,968	28,998
1921 .....	2,953	3,310	12,124
1922 .....	1,700	2,952	8,774

The decidedly reduced amount of these drugs imported in 1915 was largely due to the difficulty in obtaining them at that time on account of the War.

It is particularly interesting to note how rapidly the importation of these drugs has dropped since coming under the control of the Federal Department of Health.

It was estimated that only one-tenth of the opium imported into the United States was used for legitimate purposes. This was very well borne out in Canada by the fact that the Federal Department of Health, through the amendment to our "Narcotic Drug Act" and its more rigid enforcement, caused a very decided reduction in the amount imported, limiting it to that for legitimate medicinal purposes only.

The Federal Department of Health further points out an interesting phase of the work in connection with the suppression of the illicit traffic in these drugs—the smuggling end of it. This obviously is due to the enormous profits which are derived from the sale of narcotics for illicit purposes, running, in many cases, into several hundred per cent. Consequently, large amounts of these alkaloids have been imported under all sorts of false labels.

They felt that the climax was practically reached a short time ago when a shipment of innocent-looking statuettes arrived at the port of Quebec. Fortunately, the Customs authorities had advance information from France of this shipment, which was stated to contain narcotics. It was found that these statuettes had been sawed in two, filled with morphine, re-cemented and coloured over so as to make detection almost impossible even on the closest examination.

The extent to which this traffic is involving our children—boys and girls yet in their teens—is appalling, as has been demonstrated where surveys have been made by the police and other authorities. A not unusual practice for spreading and developing this habit is the

presence of some of these traffickers in ballrooms, with a powder composed of cocaine and boracic acid, the so-called "pleasure powder" or "snow." After a brief conversation, they sprinkle a little on the back of the hand of some young man and he snuffs it up. The effect is almost instantaneous. This is repeated only a few times when they develop an appetite and add very materially in this way to the clientele of these underworld organizations of traffickers.

#### LEGISLATION.

The first legislation in Canada was in 1908. This was the result of the heavy claims made by the Chinese in consequence of recent riots and raids on their premises and destruction of their property on the Pacific Coast. The Act dealt with the opium traffic only. This was followed by the conference at Shanghai and subsequently by the International Conference at the Hague in the latter part of 1911, which was called following the findings of the Shanghai Conference, for the purpose of controlling the production, sale and use of opium in all countries. Forty-four out of the forty-six countries represented at the Hague Conference agreed to prepare and pass the necessary legislation, the dissenting countries being Germany and Austria. For the most part the results of this conference lay in abeyance during the War. However, it was subsequently made a part of the Treaty of Versailles.

In 1914, however, the United States passed an Act known as the Harrison Narcotic Drug Act, which is alleged to be most impracticable, practically playing into the hands of the underworld, the vilest of all criminals, the narcotic drug trafficker, inasmuch as it has made it so difficult for the medical men to treat these cases and comply with the law that few have undertaken it and few are prepared to take the chances.

It is claimed that the only advantage that the Act has is that of revenue producing, inasmuch as it taxes every physician as well as every chemist or dealer in opium and its derivatives in any form, and in that way secures a substantial revenue. As evidence of this Act having failed to accomplish that which it was supposed to have accomplished, the importation, use, abuse and the illegal traffic in these drugs has steadily increased ever since the passing of this Act. It is the opinion of the medical profession that less than one-tenth of all the opium that is legally imported into the United States is used for medicinal purposes, to say nothing of the enormous amount that is smuggled in.

The Canadian Amended Narcotic Drug Act is probably one of the best laws in force in any of the nations. This Act, as opposed to the principles of the Harrison Bill, places all legitimate practitioners of medicine in the Dominion of Canada on their honor—does not

require a license fee, simply a declaration. We certainly hope, therefore, that the medical profession will see to it that there are no betrayals of trust.

Any of our readers interested in the wording of this Act can secure a copy by writing to the Federal Department of Health, Ottawa. However, in our judgment, no legislation yet enacted will efficiently control this cursed traffic. The only effective legislation must necessarily be of an international character, and must prohibit the production and manufacture of opium and its derivatives, cocaine, etc., beyond that amount which is essential for medical, surgical, dental and veterinary purposes.

In the meantime we have to deal with the most damnable of all criminals, the underworld drug pedlar, drug smuggler, the illicit drug trafficker. Owing to the large profits on this traffic, many underworld companies have been organized with large sums of money at their command. These drugs are being smuggled into the country by all imaginable devices. They enter labelled sulphate of quinine, or in various nuts from China and other countries; a small portion is cut from one end of the nut shell, its contents removed, the drug put inside, and the portion removed carefully replaced. These companies are equipped with airplanes and automobiles, conveying liquor oftentimes into the United States and coming back well loaded up with three narcotic drugs.

However, this need not surprise us, when we are told that cases of whiskey are being delivered all over the Dominion, and when we realize that a man can carry thousands of dollars' worth of these drugs in his vest pockets.

It is apparent that the penalty must be made to fit the crime. This is our only hope. The minimum penalty for traffickers in these drugs should be several years, if not a life, of penal servitude at hard labor, with a liberal number of lashes at the beginning of the sentence.

#### CONCLUSIONS.

(1) Drug addiction is decidedly on the increase throughout the Dominion.

(2) The drug addict is not necessarily mentally sub-normal, or if so, then a certain percentage of our doctors, lawyers, ministers, successful merchants and manufacturers and pharmacists might be classed as mentally sub-normal, inasmuch as they constitute a part of the whole number of addicts.

(3) The victim of the drug habit is a sick man, a man who in a large percentage of cases has been sinned against rather than sinning; of all sick men, he is probably most deserving of skilled care and sympathetic treatment. There are few more pitiful spectacles to

behold than the drug addict when his drug is being withdrawn. None but those skilled in these drugs, their therapeutic effects, their physiologic effects, the pathological conditions produced in the blood by the continued use of these drugs, can properly sympathize with these victims. They gain a grip so insidiously. Some individuals have greater susceptibility than others. Once a man becomes a victim, it matters not what his previous status has been, he will lie and steal,—in fact, nothing is too low for him to stoop to in order to secure the drug. Seventy per cent. of the victims on this continent are under 30 years of age, and a large number of these in their 'teens.

(4) In view of the foregoing facts, and in the light of the knowledge we now possess, what a pitiful reflection it is on our intelligence that we are still dealing with these cases in our courts and prisons, instead of in our hospitals under skilled medical care, or in the hospitals or institutions specially set apart for the purpose. All of our hospitals should make provision for the treatment of these cases, especially those connected with the University where instructions are being given to our undergraduates in medicine, as it is a regrettable fact that there is a limited knowledge as regards modern methods of treatment of these unfortunate victims.

(5) The underworld drug pedlar and the drug trafficker and the drug smuggler may well be treated in our courts and in our courts only, where the penalty should be made to fit the crime. If our Federal authorities find later that there has been some betrayal of trust so far as the medical profession is concerned, and that there are in the Dominion, as they have found not unfrequently across the line, "script doctors," the penalty for these men, inasmuch as they know the consequences, should be much more severe than that of the underworld drug pedlar.

One of the "script doctors" across the line cleaned up a little over \$75,000 in one year in writing prescriptions at \$3.00 each. The best he can do now is to visualize that \$75,000 through the bars of Sing-Sing, where he is serving a life sentence.

It usually requires a calamity or an impending calamity to arouse the people to a sense of their duty towards their fellow-men and to the Nation. Let us hope that the people of Canada will recognize the "hand-writing on the wall," and not wait for any greater calamity than has already befallen us in this respect.

It is gratifying to know that our very efficient Chief of Police has made application to the Federal Government to have the law amended so as to make, as nearly as possible, the penalty for the offence of drug peddling and for any violation of the Narcotic Drug Act, commensurate with the crime. —*Department of Public Health, Toronto.*



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## ALBERTA.

THE Alberta Dental Association will hold a convention at Calgary during the latter part of July. A large attendance is expected from members of the Association, and members of other Provincial organizations will be heartily welcomed at the meeting.

Dr. Arthur D. Black and Dr. H. Methven of Chicago have been secured for a four day meeting, and they are prepared to give a valuable intensive course of lectures and clinics on several branches of Operative and Prosthetic Dentistry.

Local committees have been formed to make the stay of visitors as enjoyable as possible, so that with first class clinicians and good entertainment, a top hole meeting is assured.—J. W. C.

## MANITOBA.

### WESTERN MANITOBA DENTAL SOCIETY ELECT THEIR OFFICERS.

AT the annual meeting of the Western Manitoba Dental Society held recently in Brandon, the following officers were chosen for the ensuing year: President, Dr. H. A. Croll, Souris; vice-president, Dr. R. C. Jones, Brandon; secretary-treasurer, Dr. W. J. Sanders, Brandon; executive committee: Dr. H. B. Gorrell, Minnedosa; Dr. F. S. Spiers, Brandon, and Dr. E. R. Howes, Brandon.

In the afternoon, Dr. A. J. Foote, of Appleton, Wisconsin, conducted an interesting clinic on Tinker's method of crowns and cast clasps work, and gave a paper on the same subject at the evening meeting.

The Medical Art Building is the name given to the new building recently completed (and owned by the tenants) for physicians and dentists at the corner of Kennedy and Graham. The building has five floors including the half basement floor. Whilst the exterior is

probably not very pretentious, yet the interior is admirably finished and well suited to the purpose.

The following are the dentists who have moved to their new offices:—W. F. Taylor, J. F. Taylor, Chas. Walsh, W. H. Reid, Norman Carmichael, Chas. Moore, C. P. Banning, J. F. Morrison, Dr. Olson. Over fifty physicians occupy offices in the building. The movement has already had quite a salutary effect on office rents in the best buildings on Portage Ave., as space is available from 15 to 25 per cent. less than formerly demanded.

At the Annual Reunion dinner of former members of the C.A.D.C., the following officers were elected for the ensuing year:

President . . . . . Dr. D. P. Stratton.

Vice-President . . . . . Dr. N. C. Carmichael.

Secretary-Treasurer . . W. J. Spence.

About thirty were present, with Dr. C. H. Moore (President) occupying the chair.

At the Kiwanis minstrel show recently put on at the Walker Theatre, the two dental members, Drs. D. G. Leckie and W. W. Wright, both took part. Dr. Leckie was an end man and a soloist, this being the second time that he has taken that position in a very creditable manner. In a similar entertainment last fall by the Rotarians, Dr. C. F. J. Jackson was invited to assist.

The Dental Company of Canada are now located in their new branch offices in the Boyd Building, Winnipeg. The Ash-Temple Company have completed an extensive rearrangement of their quarters, suitable to the faith they have in the future of the West.

—W. W. W.

## SASKATCHEWAN.

### DENTISTS HONOR PRACTITIONERS OLD IN SERVICE.

**T**WO Saskatchewan pioneers of the Dental Profession, Dr. W. D. Cowan and Dr. J. F. Guerin, were the guests of honor at a gathering of dentists from many points in the Province, held recently at the Assiniboia Club, Regina.

Dr. Guerin has practised in the West for 40 years, while Dr. Cowan has a record of 33 years.

Gold mounted canes were presented to both Dr. Cowan and Dr. Guerin by the members of the Dental profession.

Dr. Gregor Smith, President of the Regina Dental Society, presided at the gathering, and extended a special welcome to the members of the profession who came from outside points.—C. W. P.

# THE COMPENDIUM

This Department is Edited by  
THOMAS COWLING, B.A., D.D.S., Toronto

A SYNOPSIS OF CURRENT LITERATURE RELATING  
TO THE SCIENCE AND PRACTICE OF DENTISTRY

## DENTAL CARIES IN RELATION TO THE STRUCTURE OF THE TEETH.

THE Medical Research Council (England) has appointed a Committee for the Investigation of the Causes of Dental Diseases. This committee has decided to issue reports on various aspects of the investigation as they are completed. The first report has been presented and is commented upon by "The Lancet" as follows: "This interim report does not represent the committee's final word. The significance of this subject is two-fold. There is, first, the question as to how far variations in the density of the calcification of the teeth may predispose to dental caries; secondly, the question arises whether the enamel is to be regarded as an inert substance which, once formed, is incapable of further change, or whether it contains organic matter and may be within the pale of nutrition and possibly capable of reacting to injury like other tissues." That the stagnation of carbohydrate substances, causing the formation of acid, and the gross defects of the enamel such as occur in hypoplastic teeth, by favoring the retention of starchy foods—these two factors are generally agreed upon. There is, however, no general agreement as to the importance of structure in the spread of dental caries.

Sim Wallace points to the undeniable fact that hypoplastic teeth, though favoring the inception of caries, yet because of their poorly calcified structure, often lead to a natural arrest of the process.

Another view, held by Mrs. Mellanby, is to the effect that defective calcification is due to deficiencies of diet. She points out that many deciduous teeth which appear perfect to the naked eye, on microscopical examination frequently reveal defective formation of enamel and dentine. Over eighty per cent. of deciduous teeth examined showed imperfect calcification, and of these the great majority were carious. In view of the fact that the deciduous teeth commence to calcify before birth, it is obvious that preventive dentistry finds its place in ante-natal hygiene.

Does the enamel contain organic tissue? The available evi-

dence is rather confusing. Tomes teaches that the enamel is entirely inorganic, and Pickerill that enamel undergoes a hardening process after eruption. Broderick holds that during periods of calcium deficiency, lime salts may be withdrawn from the enamel. Evan, as a result of thorough chemical analyses, shows that a small though definite amount of organic material is present in enamel.

On the histological side of the question, Mummery demonstrates that enamel contains spaces that are penetrable by stains. These spaces may be filled with protoplasm. At first sight one might infer, from the results of investigations made so far, that the importance of the old theory of carbohydrate stagnation is seriously discounted. This is, however, far from being true. The problem of etiology of dental caries is becoming more and more complicated, and until some definite conclusions are reached, we would be well advised to continue our present prophylactic measures.

Can we arrest dental caries? Quite frequently we find cases where the process of caries has been arrested and the tooth has become even harder than normal. This condition, common in deciduous teeth, is oftentimes found also in permanent hypoplastic molars. The caries, instead of spreading down the dentinal tabules towards the pulp, spreads laterally and causes a large area of the enamel to flake off. This leaves a broad, flat surface which does not favour food retention; at the same time the pulp reacts to an injury not intense enough to kill it, and causes a hypercalcification of the dentine. The tooth, though discolored and eroded, remains healthy. The Howe method of silver nitrate reduction is of value in the arrest of caries.

The reports of this investigating committee will be published in dental journals as they are issued from time to time.

#### SOME THOUGHTS ON MODERN MECHANICAL DENTISTRY.

**I**N a paper read before the Liverpool Odontological Society by E. Y. Richardson, L.D.S., attention is called to what may be regarded as a retrograde tendency in modern mechanical dentistry. As the outcome of general observation, examination and hospital experience and private practice, it is apparent that a large number of dentists neither know, or care to know, correct oral technique, muscle trimming and scientific occlusion, but are content to practise the rule of thumb methods adopted for a generation. These facts may be exaggerated and are obviously incorrect in their individual application; but taking a broad and general survey of mechanical dentistry as it is practised today compared with twenty-five years ago, one is forced to the conclusion that the charge has more than the semblance of truth.

Whatever were the shortcomings of the older practitioner, with very few exceptions, he was an excellent mechanic, sparing neither

labour, skill nor expense in the attainment of his object. The faults and failures that one observes today are largely due to the attitude of the pupil towards mechanical dentistry.

A fatal habit has developed in recent years of taking impressions and bites, and then simply handing the cases, with shades of teeth, etc., over to the mechanic for completion. The mechanic naturally has not seen the patient. He is not usually an artist in any sense of the word, but, even if he were, the opportunities of giving expression to his artistic sense are limited. He concerns himself largely with elementary mechanical details and aesthetic considerations play only a small part in his day's work. The result is obvious. The finished denture may possess every element from a workman's standpoint that goes to make the ideal case. It may subserve fairly well the function of mastication; its adhesive properties may be quite satisfactory, yet the effect produced upon the observer aesthetically is little better than that of a row of painted teeth upon a mask. There is apparently no attempt at adequate contouring of the features, of careful selection of teeth for length, width, colour and type; but above all there is lacking the element of naturalness, as though they had grown, which every denture that is truly characteristic ought to possess. Moreover, in cases where excessive absorption has taken place, combined with a short upper lip, it is fairly common to come across a denture with artificial gum showing one-eighth of an inch above the teeth. Perhaps the advantages of porcelain gum section work has never even been mentioned to the patient, but rather that, having been born with a short upper lip, the inevitability of a more or less unsightly result has been impressed upon him.

There is a further art that seems lost today, though it was the ground-work of the beginner of thirty years ago, namely, the ability to grind, shape and polish a tooth, so that its cervical margin shall coincide accurately with the neighbouring natural tooth or teeth; and its body be varied and modified to suit its surroundings. It would seem that, for the average dentist, the correct grinding, fitting and shaping of one tooth is not of sufficient importance to justify his taking the work out of the hands of his mechanic. Today it is quite common to find students who think that any attempt to grind and shape anterior teeth is a mark of an inferior workman.

Another regrettable feature of modern mechanical dentistry is the prevalence of vulcanite work, very largely to the exclusion of gold or other form of metal plate. Vulcanite is often used in mouths where its use is distinctly contra-indicated and where the advantages of gold or other metal dentures have never been discussed with the patient. Assuming for the moment that gold and dental alloy for economic reasons are ruled out in many cases, the alloys of silver and tin, etc., for cast metal work have come so much to the fore, especially in the

treatment of fractures, that once the advantage of a medium next to the mouth possessing the property of conductivity to a high degree becomes fixed in the mind of the profession as a whole, a base almost as cheap as vulcanite, and vastly better for the patient, will be evolved.

What are the causes underlying the present-day defects in mechanical work? The first and most important cause has been the gradual whittling down of the period allotted for mechanical training. Whilst he has been rushed through a variety of processes, he is actually master of a very few of them, and, once in practice, is at the mercy of his mechanic, because, conscious of the fact that, if work is improperly carried out, he has not sufficient manual skill and experience to rectify it. The second factor that acted disastrously was the Great War. For four years there was neither time nor assistance to do other than bread-and-butter dentistry. Materials were scarce and expensive, mechanics could not be obtained, and people were so busy and preoccupied that they simply could not spare time for elaborate work. The result was, generally speaking, extractions, amalgams and silicate fillings, and vulcanite dentures. Cheapness has got into the dental blood stream.

How are we to bring dental mechanics back to its proper place in the dental curriculum? A dentist worthy of the name should be very like a good architect or engineer. The dentist should be the master mind in his practice to design, mould and build every denture, as surely as an architect builds a beautiful home or an engineer a bridge.

#### PERNICIOUS ANAEMIA AND ORAL SEPSIS.

THE report of Dr. P. N. Ponton and his associates, on their investigations of cases of pernicious anaemia, is given in the February issue of *Lancet*. The reported notes on oral sepsis are as follows:

"We have investigated as far as possible from these records the frequency of oral sepsis, and we are confronted by the difficulty of appraising what is exactly meant by this term. Of the 117 cases the state of the mouth is unknown in 13, and pyorrhoea was said to be present in 47. In addition, 13 patients had false teeth, 2 were edentulous, and 3 were noted as having few teeth. In 10 cases mention was made of carious teeth; in 8 cases the adjective 'fair' was applied to the state of the mouth; in 12 cases the teeth were described as 'clean'; and in 9 cases as 'good.' In this series, then, of 104 cases investigated on this point, in only 21 was the mouth described as free from sepsis. For purposes of comparison, we have examined the mouths of 100 adults over the age of 25 in the medical

wards of the London Hospital, and found that 37 had pyorrhoea, 29 had carious teeth, 20 were edentulous, and 14 had clean teeth, free from sepsis. We are not of the opinion that oral sepsis has any proven etiological significance in pernicious anaemia, although we freely admit that it cannot be but detrimental to a patient's health and may at times produce a secondary anaemia such as is caused by any other chronic affection."

In the treatment of the cases mentioned above, all received thorough dental treatment and in some cases complete extraction was resorted to. The investigators state that they failed to satisfy themselves of the cure of a single case of pernicious anaemia by the treatment of oral sepsis. They suggest that dental treatment should be limited to definite septic foci, and otherwise should as far as possible be conservative. It may be rated here that, although partial arrest and remissions are not infrequent, the prognosis in pernicious anaemia is so very unfavorable that the authors stated as their considered opinion, "recovery from pernicious anaemia is an event of such rarity that it cannot be accepted in any case without the fullest confirmation."—*Reported in The Dental Record.*

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## Railroad Rates to the Cleveland Meeting

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ALL railroads in the United States and Canada will sell round-trip tickets at one and one-half fare, on the "Identification Certificate Plan," instead of the "Certificate Plan" used heretofore.

You cannot obtain the rate without one of these certificates. One certificate is sufficient for a member and dependent members of their families. These identifications will be ready for distribution August 1st. However, application should be filed at once.

One of these identification certificates will be mailed to any member of the Canadian Dental Association, on application to D. C. Bacon, Chairman of the Transportation Committee of the American Dental Association.

D. C. BACON,  
Chairman Transportation Committee,  
American Dental Association,  
31 N. State Street, Chicago, Ill.

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TO REMOVE THE STAIN OF IODINE.—Iodine stains can be easily removed from dental napkins and other fabrics by washing the spots in ammonia water.—*Dental Surgeon.*

# MULTUM IN PARVO

This Department is Edited by  
C. A. KENNEDY, D.D.S., 2 College Street, Toronto

HELPFUL PRACTICAL SUGGESTIONS FOR PUBLICATION, SENT IN BY MEMBERS OF THE PROFESSION, WILL BE APPRECIATED BY THIS DEPARTMENT

UNUSUAL NOVOCAIN REACTION.—Never having heard or read of any similarly unusual reaction following novocain injection, I herewith report the following case as worthy of note:

Patient age thirty-five, female, married, digestion normal, heart in good condition, but thirty-five pounds underweight; lower right second molar crowned, abscess appearing periodically; X-Ray showed marked periapical area. Injection of two per cent. novocain for infiltration anaesthesia produced numbness in the left arm within one minute; within two minutes both legs became numb, the left one particularly. Patient fainted shortly after injection and was revived by the instant dropping of the back of the chair below the level of her feet and the use of restoratives. A second fainting spell followed, lasting but a few minutes, and the patient revived by the same means.

At my instance a physician was called in, found her heart in good condition, and the tooth was extracted under nitrous oxid and oxygen gas, which the patient took very nicely. The numbness in the left arm and both legs lasted for half an hour.

The next day several little whitish sores appeared on the lower lip. After the extraction patient informed me that she had had a similar experience following the extraction of a tooth some years ago.—D. SCOTT AUSTIN, D.D.S., *Philadelphia, Pa.*

TOXICITY OF COCAINE. — The dangers from hypodermic injections are chiefly two: First, the needle may enter a vein, and the entire dose be carried at once, en masse, to the vital centres; second, the solution or needle used may not be sterile, the resulting injection setting up remote or indirect symptoms. The rapidity of absorption has its dependence upon two factors, physiological and physical. If the circulation is active, absorption is rapid; but if it is depressed, absorption is slow. The physical characteristics of a drug greatly affect the rapidity of its absorption also. Thus the more volatile, diffusible and soluble the medicament, the greater the speed with which it will enter the circulation—L. R. GANS (*Dental Cosmos*).

# JUVENILE JINGLES

*Contributed to ORAL HEALTH by Dora L. Cameron,  
Wenatchee, Wash.*

## Moving Over

Little teeth are moving over,  
Larger ones are going to come;  
They are rooted deep and waiting,  
Hidden just below the gum.

Wise wee boys and girls are working  
With their tooth brush every day;  
So the mouth and gums are ready  
For these new teeth, come to stay,

If they find all sweet and healthy;  
But, if not, why, right away  
They grow sore and lose their beauty—  
Start to crumble and decay.

So be very, very careful,  
Guard your mouth with greatest care,  
For the other teeth are coming—  
They will very soon be there.

---

## The Nicest Drink

I know the very nicest thing  
For girls and boys to drink,  
To make them well, and big and strong,  
Make pale cheeks round and pink.

It's milk, my dears, rich, pure, and sweet!  
There's nothing else I know  
That's half so good for little folks,  
To make them smile and grow.

---

## Just Forty!

Ten teeth above, ten teeth below,  
Ten little fingers, and ten toes,  
At six years old I know you'll find  
A part of every perfect child.

Now, four times ten are forty. See  
How very careful you must be  
To keep them clean, and healthy, too,  
To work and play and grind for you.

# ORAL HEALTH

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## EDITORIAL

### What is Meant by an Ethical Dentist?

SUCH a question as the above has been provocative of much discussion. In recent years much has been said and written on this vital question, and yet there exists in the minds of many today a very hazy conception as to the line of cleavage between the ethical and the unethical.

If we could for a moment succeed in brushing aside the "thou shalt" and "thou shalt not" that have surrounded and submerged this subject, and for a moment lay bare the underlying principles, the question would resolve itself into a very simple one, indeed.

Let us keep in mind the foundation truths—that ethics and morality are synonymous terms—that an ethical man is a man of character, and, that therefore, the secret of ethical conduct is to be found only in genuine character.

There is just a danger of an inclination to treat our professional ethics like our office coat—something to be donned during office hours, but left behind when the key is turned in the door for the day. "There is all the difference in the world between the negatively ethical practitioner and the positively ethically one, whose ethics or morality seems to bloom spontaneously like the flowers, with a character and conduct that down to the very roots is free. The one man's conduct is stiff,

stereotyped, artificial, while the other, breathing the atmosphere of moral health, pursues the course of honor and integrity with ease and natural dignity."

He is not, in the highest sense, an honest man who does an honest act with difficulty, and who would rather act dishonestly. The honest man is one whose whole nature abhors anything that savors of dishonesty.

The most outstanding ethical Teacher the world has ever known was the lowly Nazarene, who hesitated not to smash the elaborate moral codes of the proud pharisee, that he might teach mankind the stern lesson that the spirit ruleth, rather than the letter.

After all, might it not be for our good in this new and enlightened dispensation if we would earnestly cultivate the spirit of the old Greek physicians and keep before us in the simplest form the great moral and professional ideals that should inspire every professional man in his practice.

The sacred oath of allegiance and consecration known as the Hippocratic Oath taken by these Greek physicians, two thousand years before Christ, enunciates in a few short sentences the underlying principles that should govern the life and conduct of members of the healing art. For the serious consideration of ORAL HEALTH readers it is here produced in substance.

"I swear by Apolla the physician that I will reckon him who taught me this art equally dear to me as my parents, to share my substance with and relieve his necessities if required. I will follow the system of regimen which, according to my judgment, I consider for the benefit of my patients and abstain from whatever is deleterious. I will give no deadly medicine to any one if asked, nor suggest any such counsel. With purity and with holiness I will pass my life and practice my art. Into whatever houses I enter I will go into them for the benefit of the sick and will abstain from every voluntary act of mischief and corruption. Whatever in connection with my professional practice or not in connection with it, I hear or see in the life of men which ought not to be spoken of abroad, I will not divulge, as reckoning that all such should be kept secret."—R. G. McL.

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THE SCIENCE OF NUTRITION.—The ultimate aim of scientific investigation is to give man control over the forces of Nature. The science of nutrition gives promise of making possible the realization of the optional condition of physical well being, with all that this implies for the mental achievement, freedom from physical defects, including tooth decay, and immunity to many of the ills which result from invasion of the tissue through breaches in the barriers of bodily defence, especially through decayed teeth and debilitated alimentary tract. —MCCOLLUM'S "NEWER KNOWLEDGE OF NUTRITION" (*Dental Digest*).

# ORAL HEALTH

A JOURNAL THAT STANDS FOR THE "OUNCE OF PREVENTION," AS WELL AS THE "POUND OF CURE"

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## Preventive Dentistry\*

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IT is significant of the progress being made by our profession that to-day we are studying the possibilities of preventive dentistry.

If we look over the programmes of the different Dental Societies in all sections of the country, we will find that the season of 1922-1923 contains at least one or two papers bearing upon this subject.

It is not only our profession that is interested, but the public and health organizations are also asking for information upon the possibilities of some procedure being evolved which will help to curb if not entirely prevent the appalling ravages of dental caries.

I do not care for the term "Preventive Dentistry." It implies a restricted interpretation, namely, the prevention of tooth decay, whereas, a proper interpretation would include the prevention of an unhygienic condition of the mouth. The more we study the subject of mouth hygiene, the more are we impressed with the fact that the condition of the soft tissues of the mouth play an important part in the maintenance of oral hygiene. However, until a better term is coined to cover both the hard and soft tissues, we must use the title "Preventive Dentistry."

This subject can be divided into two classifications. The first is Practical Preventive Dentistry and the second Educational Preventive Dentistry.

Practical Preventive Dentistry are those procedures which can be put into operation now. They are services which each member of our profession can give to his patients to-day.

\* Paper read before Dental Society, Watertown, N. Y.

Educational Preventive Dentistry are those procedures which will gradually bring about a better and more perfect development of the dental organs before eruption. This will take time and probably several generations will come and go before any marked results can be obtained.

To gain the greatest benefits from any programme of Practical Preventive Dentistry, we must include the consideration of procedures that apply to patients of all ages.

The greatest benefits will be secured in the work done for children and here lies our greatest hope of being able to prove the reliability and permanency of any preventive measure.

As soon as four or more of the temporary teeth have erupted, the parent should bring the child to our office.

Our first step is to gain the confidence of the child. To do this we must love children. The dentist who does not love these little ones is debarred from being of any use in this work. If the dentist loves children, it will not be impossible for him to gain the child's confidence. The old song, "For Love will find a Way," applies here with more truth than in any other love affair.

Having gained the confidence of the child, we should now examine the mouth and with porte polisher clean and polish the little teeth.

Instruction in the home care of the mouth must be given to the mother. Advice upon foods should be emphasized, particularly hard foods and the dentist should insist that the child must come regularly every three months.

As soon as the molars have erupted, they should be carefully examined and if there are any fissures or pits which because of their formation are difficult to keep clean, cut out and fill before decay starts, or at least use nitrate of silver and precipitate by the Howe method.

If the child is first brought to you at the age of four or five and there are several decayed teeth and the mouth is unclean, our first step should be to put the mouth in a healthy condition. This can be done by first, carefully cleansing, and second, by removing all unsavable teeth. Copper amalgam, copper cement, silver cement or nitrate of silver should be used in cavities of teeth that can be saved without pulp destruction. If there is pulp exposure, much depends upon the age of the child and how soon before the permanent tooth will erupt. It would seem advisable to take X-Ray pictures and ascertain the proximity of the permanent tooth and conditions of the roots of the temporary tooth. Care must be taken that no procedure is adopted which will make suppuration possible. It would be better to extract and provide some means for retaining the space than to run the danger of suppuration.

As soon as the first permanent molar erupts, carefully examine the occlusal fissures. If they are shallow and your finest pointed explorer does not stick, clean, dry and treat with nitrate of silver by the Howe

method. If, however, these fissures are deep and explorer sticks, I advocate the practice of Prophylactic Odontotomy.

In an examination of over 39,700 records, it has been found that 74 per cent. of all first and second molars and second premolars had decayed upon the occlusal surface. It is also found that among 5,000 employees of two different industries that 47 per cent. of all first molars were lost. There can be but little doubt that in 80 per cent. of these lost molars, the decay first started upon the occlusal surface.

It is interesting to find that even rocks suffer from similar imperfections. In the Literary Digest for September 23, 1922, page 23, we read: "Granite is regarded as one of the firmest foundations. It is liable, however, to blind joints, invisible planes on which there has been no actual parting, but the minerals have been strained and are ready to react to forces of decay. The engineer cannot discover blind joints. Investigation by the microscope alone can demonstrate whether or not they are present. They seek to excavate the foundation rocks which show no open joints or to seal visible joints by cement."

In studying smallpox, we find there is a percentage of mortality of less than 7 per cent. among those vaccinated, less than 32 per cent. among those unvaccinated, while the loss of first molars is 47 per cent. During the smallpox epidemic in Luxemburg in 1905, there was a mortality of less than 11 per cent. among those vaccinated and 50 per cent. among those unvaccinated, while the percentage of molars having occlusal cavities is 74 per cent.

Dr. Butler of Washington has shown that of 1,000 cavities on first permanent molars, over 87 per cent. are occlusal cavities.

In view of these findings, is it not true that if we wish to inaugurate a real preventive dental campaign, we must start by removing this area of susceptibility to dental caries and place there something indestructible to the bacteria of the mouth?

Why should we wait until decay has entered? Preventive Dentistry must mean the prevention of decay, not the removal of it.

Care of the soft tissues of the mouth needs our constant attention. When we realize that slight gingivitis means the possibility of infection being carried by the lymphatics into the pulps of teeth and of course being possibly carried by the same channels to the tonsils and other parts of the body, we at once appreciate the importance of securing and maintaining the health and integrity of the soft tissues.

Normal, healthy gums are practically impervious to bacterial invasion, but when they are congested and inflamed, they become open gateways for the entrance of infection.

Preventive dentistry must therefore include the care of these tissues. Careful examination must be made for traumatic occlusion and when found, corrected.

If tartar or calcareous deposits are found to accumulate rapidly and we feel reasonably sure that the patient is taking intelligent care of the

mouth, we must investigate the question of diet. The family physician should be called into consultation and the importance fully explained to him. We must impress upon the physician what gingivitis really means to his patient. That when it is present, there is a slow absorption of septic matter going on all the time. If infection of the tonsils is a serious matter, how much more so is infection of the gingiva. We must remember that the gingiva is eight times as long as are the crypts of the tonsils.

In its broad aspect Preventive Dentistry, viz., the maintenance of the hygiene of the mouth should include reparative work. This means that our first object is to bring about by all the means at our disposal a condition which will keep the mouth in a perfectly hygienic condition.

To be of practical benefit, prophylactic treatments with thorough polishing of all surfaces of the teeth must be given regularly, and never less than twice a year.

The following table shows the value of regular semi-annual cleansing of the teeth:

COMPARISON OF MOUTH CLEANLINESS OF DIFFERENT CLASSES OF PATIENTS.

				YES.			NO.			FAIR.		
				1918	1919	1920	1918	1919	1920	1918	1919	1920
Class	1	started in	1915	27%	33%	39%	25%	9%	6%	48%	58%	55%
"	2	"	"	1916	25	33	43	27	9	7	48	58
"	3	"	"	1917	18	35	42	29	9	6	53	56
"	4	"	"	1918	10	27	40	50	14	9	40	59
"	5	"	"	1919	..	21	33	..	27	12	52	55

### EDUCATIONAL PREVENTIVE DENTISTRY.

This starts with the expectant mother. Circumstances to-day are such as to make this a difficult task for the average dentist. Too seldom are we informed that the happy event is expected eight months in the future. Generally, our first intimation of this state of affairs is when any layman, unless he were blind, could tell something was going to happen.

The most practical solution to this problem is through public propaganda. We should have a leaflet printed by our State Society or by the National Association called "Advice to Expectant Mothers," and every dentist should hand a copy to every married patient.

Consultation and co-operation with the family physician is essential. We should be in the position of knowing what advice to offer at the earliest stages of foetal life. The dental germs form at an early stage, and it is important that the expectant mother is given the proper foods at this time. Breast fed babies have better teeth than bottle fed babies and we should emphasize this at every opportunity.

The diet for babies and children is an important factor in determin-

ing the structure of the growing teeth. Fruits, nuts, cereals, whole wheat bread, milk and vegetables are important. Meats and candies are not needed. If children are well supplied with such fruit as dates, figs, prunes and stewed fruits in which honey is used instead of sugar, we will find there will not be as much craving for candies. If, however, candies are given, let them be used as a part of the meal. Chocolate, peppermints, peanuts and candied fruits can be used as desserts, but with little chance of doing any harm.

Dentists should be members of nutrition clubs, and if there is none in the locality, they should organize and start one.

It is a sad commentary that while in every health organization, such as nutrition clubs, children's welfare work, prevention of heart defects, tuberculosis societies and others, we will always find a number of physicians are members, but we seldom find the name of dentists.

If we are to practice Educational Preventive Dentistry, we must be willing to join some of the already formed and working health organizations.

May I be permitted to suggest that a number of the men in this County arrange among themselves and agree upon a definite preventive dental oral hygiene programme. Some of the men to join one health organization, others to join other health or welfare organizations. In all these different organizations the same dental programme would be presented and worked for. In this way, recognition of the importance of the dental question will be secured and work along Educational Preventive Dental lines will be inaugurated.

We have an important part if not the most important part in all health work and it behooves us to become an active force in it. We will find appreciation and co-operation in so far as we sincerely believe in the value of our own work, and our best efforts to-day and to-morrow are along the lines of Preventive Dentistry.

### FIRST MOLARS.

Percent. of these having cavities.

Surface on which cavities are located.

Percent. of teeth lost.

	No. of Persons	FIRST MOLARS.					
		Occlusal	Buccal	Lingual	Distal	Mesial	Lost
Rochester.....	500	68	6	1	2	8	6
N.Y. City : Red Cross No. 1.....	633	44	1	2	6	4	13
" " " No. 2.....	159	93	1	3	32	26	5
" " " No. 3.....	931	86	1	3	31	50	9
North Carolina.....	21577	85	8	3	3	4	8
Dr. H. B. Butler.....		88	3	2	8	11	
Oral Hygiene Committee of Greater New York.....	8068	62	5	2	16	18	15
Girls' High School.....	2101	59	21	3	8	6	14
Wayne School.....	770	81	6	3	3	4	6
Industrial.....	5000	75	14	11	17	23	47
Total.....	39739	744	72	34	126	137	126
Average Percent.....		74	7	3	15	14	14

## SECOND MOLARS AND PREMOLARS.

Percent. of these having cavities.

Surface on which these cavities are located.

Percent. of teeth lost.

Increase according to age.

SECOND MOLARS.									SECOND PREMOLARS.					
No. of Persons			Occlu- sal.	Buccal	Ling- ual.	Distal	Mesial	Lost	Occlu- sal.	Buccal	Ling- ual.	Distal	Mesial	Lost
Between														
7	14	500	8	2	0	0	1	8	12	2	0	2	1	0
14	19	8068	45	3	1	3	3	2	11	$\frac{1}{2}$	3-10	4	4	2
17	55	5000	74	14	7	9	8	17	75	2	10	13	17	14

74% of Second Molars have Occlusal Cavities.

10% of Second Molars lost in school children.

47% of Second Molars lost in adults.

## The Rising Tide of Preventive Dentistry Through Education\*

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THIS is the first opportunity I ever had to talk to the Canadian Association, and as I told some friends to-day, I had a peculiar thrill come over me when I came into Toronto—something a little different than I have ever had before. I was born, you know, about sixty miles from here, and I have not been back here for about forty years now. So I feel that in a way I am at home here, because I am of your blood. Anything that I may say has been inherited from this community.

I live in a little city. We have only about 15,000 inhabitants, but we have a great many visitors who are interested in Periclasia. So every visitor we have we ask: What are you doing in Periclasia or Preventive Dentistry? And this is about the answer we get. Besides living in Rochester, I have in the last three years gone over a good deal of territory in the United States, and they all make this report, or very similar: In our district people will not brush their mouths; they just will not do it. And more than that, they complain about paying a fee for talking to them or giving them knowledge. Now that runs all the way through the States, from Houston, Texas, to Boston. So I take exception to that remark. I say: Why won't your people brush their mouths? And you realize when I say brushing their mouths, I mean brushing the *mouth*, as brushing the teeth is just partially cleansing the mouth.

\*Read before Ontario Dental Association, King Edward Hotel, Toronto, 15th May, 1923.

And again, what is at fault when they complain about fees? I say: That is all right, I complain about fees too. I am in an organization here, and I hear people complain about fees. I complain about fees. I paid \$12 for a pair of shoes the other day, and I hollered my head off, so why should we be so sensitive about patients complaining about prophylaxis? Then I ask my friends: Do you give them anything that would warrant a fee?

So with that thought in mind, I am going to read you a paper entitled "The Rising Tide of Preventive Dentistry through Education."

The first thing we do is to educate our patient. I often give a patient this illustration. It is just a homely illustration that I have gotten up myself. Supposing your physician told you to take a certain exercise five minutes every night (illustrating the exercise) you would look that over and you would say: All right, I need that; if it is going to do me some good. You would do it for a couple of nights, then some night you forgot about it, and sitting up in bed you would debate: What good is that doing for me anyhow? The chances are you would not take it very long.

But if he told you you were tubercular inclined, that your right chest was under-developed, and by taking that exercise five minutes every night your right chest would be developed and in that way your inclination to tuberculosis would be lessened or removed, you would be much more likely to take that exercise, would you not? Now I am going to do that with your mouth,—what you do when you brush your mouth. I am going to tell you that you can eliminate approximately 80% of decay and 80% of pyorrhea, and not only that, but the mouth is more of the centre of infection than any part of the body, so you can figure it in dollars and cents, and in sickness, and you are the only one that is going to derive any benefit from it. You will be repaid to just about the amount of energy you put into it, and don't you complain to your dentist when you return, about the pyorrhea.

Then we say: if you feel that you will brush your mouth somewhere near about the way we tell you, from three to five minutes every night before retiring, and three to five minutes every morning upon arising, for the rest of your natural born days, or as long as you expect to save your teeth—we say 80%—if you are going to do that, we would advise you to proceed with this treatment, and if there is any chance that you might not, this is the best chance to quit, and just save that money.

Then I say: You just think that over. And I want every patient that I treat for periclasia to tell me that they want to save their teeth and they will take care of their mouth, else I will not treat them.

Now you can get them to say it as well as not, if you lead the conversation up to it, to let them say it gracefully.

Then when my patients come back, I don't have them complaining about my treatment, but the first thing when I look at them they will say: "Doctor, I brushed my mouth faithfully for three months, and then the hired man died, or we moved to the country and you could not buy a tooth brush, and I just neglected it, and if you will get my mouth fixed up I will take care of it from now on."

Co-operation in brushing is the secret of success in the treatment of all periodental diseases. I tell my patients: If you rely on me to save your teeth, I will guarantee that you will lose your teeth before you are eighty. It is the time and attention that you give your mouth away from me and at home that is going to save your teeth, so it is up to you. And as I tell the dentists, this is one phase of dentistry that you can practise and be a Christian, as you can put all the blame where it belongs—on the patient.

Now we have the introduction to our patient, and they decide that they are going to have their mouth taken care of. Then we say: The first thing we are going to tell you is where decays are caused and what causes decays to begin, what causes deposits and where deposits begin, and what causes periclasia, (and we call it *periclasia*, too.) You will hear them going out into the reception room and they will call it periclasia, and someone will say: That is pyorrhea, and they will say: No, no, it is periclasia, that is the new name for it.

Then we tell them what is the cause of periclasia and where it begins. Then we tell the patient: I want you to pay strict attention, as you are going to be quizzed on this when we get through. Then when we get all through I want you to know just as much about the treatment of pyorrhea as I do, and I want you to know it so well that you can discuss it with your dentist at home.

I am located at a place where we meet patients from all over the country, and I do it to get at the man at home, as if this patient has been doing as he was instructed, he has not been giving very good instructions, otherwise she would not be there for me to treat her. And when she goes back it will make him sit up and take notice, and he will say: Where in the world did she get all this?

I lectured to a big crowd in Chicago recently, and I said: "Why are you here? You are here because someone is stepping on your toes, and you are here to get answers to these questions." (Speaker here enumerated a number of the present day questions which are asked of dentists, such as "Are bad teeth detrimental to health?" etc.) "That is why," he continued, "preventive dentistry is the most interesting subject we have to-day. We have got to answer these questions, because you know how I feel when they talk to me when I can't answer them. You are here to get something to handle your practice with."

So we start out: What causes decay? Decay begins wherever we allow a film sufficiently long to ferment, which forms lactic acid and disintegrates the enamel, and then we call it a cavity.

Before we talk to them, we say: How do you brush your teeth? They give various answers. Well, I say, all right. I have looked at the mouth and I don't have to ask them, because I know, I can see. So I will say: Did you brush your mouth this morning? Usually they will say: I brushed it just before I came up here. Well, you may have been in a hurry this morning, and perhaps you did not do it as well as usual. I am going to give you a brush now, and I want you to brush it well, because when you get through I am going to show you just how well you have brushed your mouth. I know they are not going to touch the spots I am looking for in there. Even if they did brush them properly, they cannot take off a heavy plaque that has been there for some time. Then when they have given it a brushing, I tell them to give it just a little more. Then I say: Is that the best you can do? Then I stain the teeth. You can use any kind of stain. This last year I have used permanganate of potash, which makes a heavy stain. Sometimes you have to use a heavy instrument to take it off. You can get them in one grain tablets. To this I add just a little bit of boracic acid, just what you could hold on the end of a pen knife. It is a stabilizer, that is all it is. You have to make it up every ten days or two weeks because it decomposes. Then I give them a mirror, and I tell them: Now, wherever your brush has reached your teeth will be clean and there will be no stain. And as a rule anyone who is used to taking care of their mouths will be horrified at the result.

I told you yesterday the principles of business are: first, attract attention; then arouse interest; create desire which terminates in action. So the first thing I have to do is to get their attention, and of course I got some of their attention, otherwise they would not be there.

But before I use the stain, I look in their mouth, and I say: "Now, Mrs. Smith, you don't keep your mouth in very good condition." Well, if it is a patient who is trying to keep their mouth in good condition, they take exception to it, and they will say: "I brush my mouth three or four times a day." And I say, "Well, really, your mouth is not in very good condition. It is a wonder you have not very many cavities." Then I say: "How is your health?" "My health is very good."

Then I say: "You are fortunate, for you have a number of conditions in your mouth which might indicate systemic troubles. Have you ever had any trouble with your stomach, indigestion, headaches, tired days when you don't feel like working at all?" (humorously). Well, you know everyone has had some of those days, so you are pretty safe in pulling that one. "Have you ever had any rheumatism?" You can scare up a few symptoms. "I advise you to go to your physician and have a good examination." As a matter of fact, we really all ought to have that every one or two years. "You are not

looking for any trouble, but if you have any symptoms or gastric ulcer or any heart lesions or kidney lesions, now is the time to take care of it, and if you have not any you go home and consider yourself lucky, because you are carrying in your mouth here every symptom."

By that time I have their attention.

The next thing is, they ask: "Can you keep this all off?" I say: "I can keep off 80 per cent., and the 20 per cent. you have got to go to your dentist and have him look after for you."

Then we start with the decay and tell them: Decay is caused by allowing film to remain upon the tooth and ferment, and it is not only the film, but the film gives retention for acid forming bacteria. It gives the bacteria an ideal breeding ground, so that the bacteria found in an unclean mouth is much more virulent than in a clean mouth, because it has much more to grow on.

So now you know what causes decay. About 97 per cent. of all decay forms on one of three surfaces of a tooth. We practise psychology all the way through.

I show them on a model, then I show them on my own mouth, then I give them a glass and show it on their own mouth. (That is in reference to brushing, which the speaker illustrated). Because you have got to get it up in the mouth before you can show it in the fingers.

Ninety-seven per cent. of all decay forms on one of three places of the teeth, that is in the fissures and grooves, on top, in between and around the gum margin. That is where we will find at least 97 per cent. of all decay. Now when you brush your teeth, brushing teeth is the best preventive for decay that we know, and brushing the gums the best preventive for periclasia. You have to remember two things, — *on top, and in between*. You can forget the gum because the brush takes care of that automatically. We never get decay on the high spot, because if you get on the low one you will strike the high one.

What causes deposits, and why do they always appear around the gum margin? What is this film? It is nothing more or less than a mixture of food, lime salt from saliva, and a mixture of everything we take in the mouth. The heavy part settles on the tooth, then the mucin sets it on the tooth, and then we call it tartar. Then we say that is what causes your tartar.

What causes pyorrhea? Anything that will cause an irritation of the surrounding structures of the teeth will cause pyorrhea. Now the only one the patient knows anything about is tartar. So we say: Tartar is the main cause for pyorrhea. We know it is not altogether, but then that is all the patient can control. The main cause really is traumatic occlusion, and it is appearing so much earlier than we thought for, and the earlier we start to attack it the easier it is to prevent.

Another thing we never talk to the patient about is improper dentistry. We never talk to the patient about it, but we know it is often the cause.

The one for you to remember is tartar.

But we have two irritants of the gum—one is a mechanical and the other is a chemical and these are the two that the patient is concerned in.

Where does it begin? About 80 per cent of all pyorrhea begins from between the teeth. Why? Now the patient wants to know this. We want them to know the beginning of this, where the trouble begins, because that is where they want to work. Why? Because the gum tissue gets less circulation than any other part of the mouth, and we always find an absorption under congestion of tissue. We have to a certain extent an absorption of process,—you have seen it on very prominent bicuspid where the gum has receded along the root, and no matter what you would do, it would not stop until it decides to stop. Where does it stop? Just as soon as the process is thick enough to allow them as good circulation. We say all disease takes place first where you have an interference with capillary circulation, and that is, you have then a congestion and lack of nourishment, lowered resistance, invasion of bacteria, then infection, and then to the Exodontist, and then if the undertaker has not got him by this time, he goes to the prosthetic man.

But that is where we find always the beginning. So we tell the patient, your pyorrhea begins from between the teeth, lack of stimulation is why that forms, and so you have to stimulate, or force circulation if you want to cure it. We don't have any trouble curing pyorrhea, but the trouble is in keeping it cured, because our patient does not co-operate, or does not do it intelligently, and the patient of course can't co-operate, unless the dentist knows what to tell them. And my experience has been that the reason so many of us don't pay more attention to preventive dentistry is because we can collect dividends much more easily from other forms of our work than from this.

It is true, people complain a little about the fees. But I tell them: It is all right, you have a right to complain. I complain lots of times about the things I buy. After I tell my patient all about this, and why this information is more valuable to them than any restoration they get in their mouth, they go out happy, and whatever they pay for this they get more for their money than any other work they can have done to their mouth, because there is no set fee for knowledge.

And we warn them that they are the only one that is going to derive any benefit from it and can take it or leave it, but we want to have a clear conscience ourselves that we have done our duty properly, and they can do as they see fit, and if they come back I will be glad to do what I can do for them, but if they don't take care of their mouths I don't want to see them very often. If they don't care for

their mouths I would rather they did not come back. If they do come back and have not taken care of their mouths, they will come back with an apology on their tongues.

I kept the record of 300 patients whom I asked: What has your dentist told you about decay?—and less than 2 per cent. out of the 300 patients said they had had nothing said to them except to brush their teeth. When we tell them to brush their teeth, it means brushing every tooth individually, not as a unit. There is no reason why anyone ought to know how to brush their mouth when he has never been told. It is up to us to teach them.

Then I say, I don't know how you brush your mouth, whether you brush crosswise and the lowers up and the uppers down. What I want you to think is where your decay starts—on top and in between. Then you brush on top and in between. Where does your pyorrhea begin? In between. Well then, the younger we are, the deeper the pits, and the more we have to brush on top; and the older we are, the flatter, and we brush well in between. So we say: Kiddies at home, you brush on top, because we find about 90 per cent of decay on children's teeth is on the surface. Then you say you brush on top and in between. When you brush backward and forward this way (illustrating) you only brush the high spots; don't brush back and forth. We don't have decay on the high spots. You don't gain anything by brushing backwards and forwards. Place your brush on here, (on the teeth), move the bristles just as much as the bristles will allow, keeping the ends stationary. I call it "wiggling" because everybody knows what wiggling means. I find about 95 per cent. of people have used a paint brush and I like to use it as an illustration. You know how you wiggle your brush to get the paint into a crack. With those who have not used a paint brush, I use the cleaning of a diamond ring as an example. Brush back until you feel the brush on the gums on the back, that is your guide that you are on the last tooth.

We hear, so often, that the third molars are of no account. They decay all over themselves. Why? Because there is a film on there that never gets taken off.

Now as we go through we describe the kind of tooth brush that should be used. They will ask: What is the name of the tooth brush? I tell them: I am not recommending any particular make here, this is purely an educational talk I am giving you, nothing in the way of advertising. We don't give the names of anything. We will say: You want to get a tooth brush that is straight across the end, bristles set apart so as to go between the teeth easily, and about an inch, and not over an inch and a quarter, long. If you get a tooth brush over those requirements, you just take a knife and make it as long as you want it. If you want one for the kiddies, cut a little more off the bristles. Then it should be about  $\frac{1}{2}$ " in depth in the bristles. So when you go into the drug store for your brush, don't let him sell you

anything, but you look them over and pick out one with the requirements I describe.

Now you can only get in action about an inch to an inch and a quarter that can stick over the teeth. The rest you cannot get any results with. Let us force ourselves to use the brush, and do the best we can, because you know it is second nature to live along the lines of least resistance. Speaker here quoted:

"Sliding along the lines of least resistance is what makes men and rivers crooked."

And you know, a good many of the fellows in dentistry come up against a little resistance, and they walk around it, and pretty soon their conscience does not hurt them any more. And they don't realize it, until someone beats them on the back and says: "Take a look back here and see what kind of a record you are making."

Then after your patient is all through, you tell him: Not later than six months from now you are coming back here to have a prophylaxis. I know you are going to take care of your mouth, but you may slide a little, and I want you back here in six months from now.

Then when they come back, I look into their mouth, and show them the spots they are not reaching,—so that they have to be reconverted at least every six months. I can't help but think of the method we are using now of giving six lessons. I got this No. 6 from a golf instructor that I was treating one day, and I said: "How do you teach golf?" He said:

"I don't want to take a pupil for golf under six lessons."

"Why six lessons?" I asked him.

"I find it takes me six times to get over to the pupils what I am trying to tell them."

So I give them six lessons, and I brush their mouths for them, so that they can see it done. I do it for another reason. What they call brushing hard, I do not call hard at all. I say you can't over-brush your mouths if you will brush them correctly. The more you brush your gums the harder they get.

If your gums bleed, that is fine, an evidence that they need more brushing. Why? They bleed because they are tender, they need more brushing, not particularly harder brushing, but longer brushing, to stimulate the circulation.

Well, they tell me sometimes their teeth are sensitive. I tell them sensitiveness is one of the first symptoms of decay, and the decay is the result of fermentation of plaque. So we have taught them how to brush on top.

Now we say: Start in and keep your brush at right angles. You know we can retain more by sight than any other way we know of,—seeing and reading we retain more than by any other method. Years ago when Professor Munsterberger of Harvard was teaching psychology he gave 298 students a memory test. He found that by

reading to them they retained one-tenth of what they heard; by lecturing they retained three-tenths of what they heard; by picturing it to them they retained five-tenths of what they saw. So to-day all successful business is carried on on that plan. So we go Munsterberger one better,—we talk to them, show them. The main thing to remember is to keep that brush at right angles, just work it between the teeth. You are trying in this way to create circulation, intelligent stimulation of the mouth. We want you to create circulation in the gum tissue, between the teeth, and any old way that you can create circulation there is all right with me.

So I start brushing my teeth on top first (demonstrating). Now have a system—show me a man who does not work on a system and you will show me a failure; he may not be a complete failure, but he is not a success. Always start at the same place and finish at the same place. Then you know you have not missed any place. So I start on top. Be sure you feel the brush on the gum back of the teeth. Then I start up at the molars on the left. But have a system. I place the brush, then I just circle that in between my teeth. Then you can see that my gums get white. They are blanched because the blood is pressed out of course. Now when we brush our mouths, the upper teeth down and the lower ones up, we hold the blood in the end—and you massage in order to get circulation. In physiology they tell us you should massage toward the heart. All we want is to keep the mouth at a point of high resistance, get up plenty of nourishment. I often tell with the molars to turn the brush perpendicularly. Of course the molars are rather wide, when you get to the bicuspid they are smaller and you can brush the other way again.

If you brush too fast, you don't give the blood a chance to work back and forth. If you brush too fast, you might be removing the plaque, but you will not be doing anything for your pyorrhea. Take three to five minutes. I tell them to go down to the ten-cent store and get one of these little sand glasses, but don't look at it. Don't use your watch, otherwise you will be looking at the watch instead of concentrating your attention on the brushing of your mouth.

Then I have another reason for doing that,—to standardize a motion, so that you know you ought to go about that fast to go over your mouth in about three minutes to get the best results. And when you get through you see if your sand is all gone. You say: All right, I have gone my three minutes. When you have your motion standardized, put the little sand glass away, but don't give it away. In a month get it out again and see how you have kept to the system.

I tell them this just to give them some kind of a method by which to standardize the brushing. So I tell them: Do this three times in each place. (Illustrating.)

Now the only method I know of where you can cleanse irregular teeth, is to just work those bristles right in there. And I use a dentri-

fice usually once a day,—at night is the important time to brush the teeth, as during sleep the saliva nearly stops flowing; all the damage takes place while you sleep.

Now we tell the ladies—they come home in the evenings after being to a party, and they will say: “Oh, I can’t give three minutes to brushing my mouth,” and they just give it a lick and a promise, and retire. I say: Don’t do that; unless you are going to give them the three minutes, don’t brush them at all, because if you are only going to give it a minute and a half you are not doing it any good, and a bad habit may be formed.

So we go around them and inside the same way. Always hold the brush at right angles. Now I brush them out with salt water because salt water is one of the best stimulators of the tissues that we have. And I get the salt water in this way: When I get through brushing the mouth, I put salt on the brush and put it away. I know that salt will keep the brush clean. I know all the bacteria in that brush are mine, and I am not afraid of these myself because my system is pretty well immune to my own. You keep your brush clean by salting down your brush; then when you make your salt water, you can make it with your brush. In this way you make the brush both antiseptic and you can make the salt water with it as well.

When you come to the anteriors, you place your brush perpendicularly, put your thumb back of the brush in this way, and rest it on your chin, and do your wiggling. You can feel those bristles—get them just as far between the teeth as you can. You can’t do them any harm. (Demonstrating.)

Now the lowers the same way. Many people gag there, and for those that do we tell them to open their mouth wide and drop their tongue. The trouble you will have when you start to use this method is, it will take you some time to control the muscles of your arm, when you do that “shimmying” here. That is the trouble most of them have, and I warn all my patients about it.

Now we get to the anteriors, it is pretty hard to get the brush in, so turn your brush back like this, hold the right hand against your face and force the bristles between the teeth.

Now you know the lower anterior teeth are hard to keep clean, so put a lot of tooth powder on there. Now teach your patient when they put paste or powder on the brush, not to put it all on at once and put it on the front teeth, because the front teeth are the cleanest teeth you have. Half of it drops in the mouth and you spit it out, and you get back to the molars and you have nothing left to clean them with. If you want nice, highly polished teeth, don’t use much dentrifice. They ask you: What is a good dentrifice? You can compare all dentrifices with Gold Dust and Sapolio. Their only quality is their abrasive. The more you brush your teeth without an abrasive the more polish you get.

Now we have the teeth brushed. Then we say: Brush the roof of the mouth and the tongue for stimulation. Now if you don't get circulation, you don't get nourishment, and without nourishment, pyorrhea, etc. Intelligent stimulation of the mouth! So we brush the roof of the mouth, then brush the gums, simply for stimulation.

Now we know we have many glands in our gums, and if you don't stimulate those glands you get a thick sticky secretion. Then we finish up by brushing the tongue. Some say they gag easily. We tell them to take their bath towel and get a good hold of their tongue with it and their fingers, and brush it.

When you are through, put salt on the brush and put it away.

I ask every patient: When you get through with your mouth, does it feel more stimulated? If I have one who says: No, it does not, I say: this must be my off-day. I will just brush that again for you, and I go after it hard. I never have to brush over three times—I did have to brush one three times. (Laughter.)

We teach them to rinse the mouth. I teach them to do this by putting the brush under running water, have it full of water and go over the mouth, then rinse the mouth, starting between the molars, then the bicuspid, then the centrals, then right around the mouth that way. (Illustrating.)

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## Fixed and Removable Bridgework\*

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BY I. H. ANTE, D.D.S., TORONTO.

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THERE is no work in dentistry that gives more satisfaction, both to the operator and the patient, than the restoration to health and beauty of a natural denture by a properly constructed and accurately placed bridge, be it either fixed or removable.

All of us learned a very great and most important lesson, and that we erred greatly in the past by making too many large structures of a fixed type; but there are, and I think always will be, many places for a fixed bridge, where one, two, or three teeth of similar functional activity are involved. In these cases I would give preference to fixed bridgework, providing that conditions are favorable and sanitation can be maintained. We never make a fixed bridge of more than two teeth out, with a few exceptions, and I think that we will always do fixed bridgework to that extent. When the space is larger, then a removable bridge or partial denture is demanded.

The only value of any method lies mainly in the range of application. There is a range of application for all forms of removable fixtures, and also a great range of application for fixed structures.

I have always found that any method requiring a great degree of exactness in construction is beyond the average dentist, either for reason of money, of time, or of ability, and therefore those methods will

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\*Read before Ontario Dental Association, May, 1923.

always be to a greater extent laboratory methods. The average dentist cannot, or will not, do it. The methods themselves are not at fault, but the operator's limited knowledge of their possibilities and application dooms them to failure.

We must recognize the fact that the trouble is the lack of correct fundamental principles, and every operator must be willing to make sacrifice of time and money for research and technical study, that he may perfect himself in those things he knows he is unskilled in.

### BRIDGEWORK.

The necessity for loss of teeth, malnutrition, faulty root canal fillings, granuloma, infective condensing osteitis, punctured roots, excessive mutilation, accidental causes, periclasia, trauma, exfoliation, growths, operations, inlays, crowns and fillings.

### FIXED AND REMOVABLE BRIDGEWORK.

#### *Causes of Failures (Tinker)*—

1. Faulty and in many cases no attempt at diagnosis and prognosis.
2. Failure to remove foci of infection and inattention to treatment and care of the investing tissues and mouth sanitation.
3. Disregard for tooth form.
4. Absence of proximal and interproximal spaces.
5. Absence of proper embrasures.
6. Faulty occlusion and articulation.

### WHY SHOULD WE INSERT A BRIDGE—FIXED OR REMOVABLE? (CUMMER).

#### *Bridge*—

1. For restoration of structures, teeth and associate parts.
2. For restoration of function of digestion, speech, expression, mastication, insalivation, deglutition.
3. For prevention of further injury as result of extraction by the insertion of good appliances.

#### *To Prevent*—

Drifting	{ Destroying normal contact, alignments, occlusion. Producing pockets for lodgements of food and susceptibility to caries and periclasia.
Exfoliation	{ Tooth becomes susceptible to caries, heat and cold.
Excess stress	{ Destruction of peridontal membrane, loosening of the teeth, condensing osteitis and periclasia.
Excessive wear	{ Pulp degeneration with sensitiveness and pain.
Stagnation	{ Unhygienic condition, susceptible to caries and periclasia.

As a basis for construction and maintenance, a definite routine should be followed out to determine the factors which go to make up a correct restoration.

1. Physiological.
2. Mechanical.
3. Anatomical.
4. Esthetic.
5. Maintenance.

*Physiological*—Surgical diagnosis to determine the procedure necessary to maintain health.

*Mechanical*—Technical diagnosis to determine the procedure necessary to proper design.

*Anatomical*—All restorations should reproduce anatomical form and perform normal function.

*Esthetic*—Execute our work in an artistic manner, with esthetic results.

*Maintenance*—Properly inserted and kept in good repair.

Under the first heading it is required to put the oral cavity in a state of health. For this purpose I believe it is necessary to have radiograms sufficient in numbers to show every tooth, crown, roots and investing tissues; full upper and lower study models, and a chart showing cavities, faulty fillings and contacts, mobility of every tooth and any abnormal condition of soft tissues which would not be plainly shown by radiograms or study models.

The first step in any surgical programme consists in the removal of pathological tissue and all products of degenerative processes, the correction of pathological conditions and the establishment of a physiological status in the field of operation.

Applied to oral restoration, surgery calls for the extraction of all teeth and roots that are unfit for further service, or are a menace to the health of the patient.

A. (1) Non-vital teeth with definite apical areas.

(2) Non-vital teeth of patients who are suffering from a serious systemic disease which is due to a local focus of infection.

(3) Teeth affected by gingivitis or trauma as to present deep-seated pockets and absorption of process sufficient to make their future retention an uncertainty.

(4) Teeth with exposed pulps which we know have been exposed to infection and whose roots may not be filled perfectly and aseptically.

(5) Malposed teeth that may not be corrected by grinding, and which interfere seriously as regards occlusion.

(6) The careful removal of any pathological condition, such as cysts, sequestrum, granuloma, etc. (Knapp.)

With the aid of our radiograms, study models, charts, and the patient, we can proceed to plan our restoration from which we may expect lasting service, beauty and cleanliness.

Under normal conditions every tooth has its own foundation, but when teeth are lost and any of the remaining ones are used to support a restoration to replace the missing ones, their foundation, no matter how strong, is weakened by the loss of supporting structure about the remaining teeth, and in many cases it is further weakened by the loss of supporting structure about these teeth.

B. (1) It is therefore a good policy to note the number of teeth as compared to the number of spaces, so that we may decide whether they constitute sufficient strength to withstand the stress to which they will be subjected.

(2) The degree of mobility which they exhibit is important, for if they are not standing firmly it is not reasonable to expect they will be able to carry additional stress.

(3) The stress of occlusion which is to be brought to bear upon the bridge should be carefully noted, depending upon whether it is heavy or light which will determine the type of abutments to employ.

(4) The teeth which are to occlude with the restoration should be noted, to determine whether they are to be ground before constructing the restoration, and how much. It should be our aim to keep the occlusal plane as nearly normal as possible, so as to maintain full efficiency in mastication. (Grind first, not after bridge is finished.)

(5) The alignment of the abutment teeth should be studied to determine whether the bridge will seat properly after construction. In bridgework where cast clasps, inlays or three quarter crowns are to be used as abutments, it is a wise procedure to first outline the clasp or carve your preparations on the study model, which allows us to plan our preparation and compensate for malposition and malalignment; also if space between abutment teeth is too narrow for normal size teeth, we can plan our construction so as to produce a more esthetic and harmonious restoration.

(6) The length and thickness, of a root, and the amount of bony attachment, will determine the amount of stress that may be safely carried. A root with a firm bone attachment for two-thirds or more of its length should carry more of a load than one having firm bony attachment of only half its length or less. A short, thick root, in heavy dense bony process, would carry more stress than a long root in a thin long process, nor can we expect a frail root like a lower incisor or an upper lateral to carry as much load as a long thick cuspid root. A pulpless tooth, if in a healthy condition, is considered just as good an abutment as a vital tooth, from the standpoint of stress to be carried.

(7) If teeth are to be extracted, it is determined at this time whether we shall restore them immediately or wait for absorption and shrinkage. For immediate insertion the over-glazed porcelain root, properly placed, with favorable conditions, in cases of one tooth, is

ideal. For partial absorption the porcelain tip pontics and the hygienic bridge should be employed; these restorations should not be constructed until a reasonable amount of absorption has taken place, from four to six weeks in the average case. The porcelain ridge lap pontic and the removable bridge should wait on almost complete absorption, from three to four months.

Up to this point the mouth has been prepared preliminary to the actual work of constructing the restoration. The teeth and their investing tissues are now in a state of health, and we have decided definitely upon our form of restoration, be it a fixed bridge, removable bridge, partial denture, or a combination of two or all of these forms.

(8) Basic mechanical principles for fixed bridgework:

(a) When the bridge is to be of a fixed type, the operator should bear in mind that foundational resistance should be greater than occlusal stress, and that clinical experience has proven that one tooth will support one missing neighbor of similar functional activities and of equal or less pericemental area than itself, providing it is not a free end bridge.

(b) Under normal conditions this space should be short, confined usually to one or two teeth, and never more than three out, unless the occlusion is such as not to exert any strain on the bridge, or the opposing teeth comprise an artificial denture.

(c) Teeth used as abutments should include only teeth of similar functional activity; that is, posterior restorations should be supported by posterior teeth only, or the cuspid and anterior restorations by anterior teeth only, or the cuspid. The physiological movement of the posterior teeth is in a different direction to that of the anterior, and a fixing of these teeth together would bring about an interference with their normal movements, resulting in impaired circulation.

(d) A straight alignment is the most favorable, and keeping away from a curved alignment or arc of a circle, as when a bicuspid and central are used as abutments. The force of mastication coming on the cuspid and lateral, which would be lateral to a straight line drawn through the abutments would act as a lever of the first class.

(e) Leverage should be taken into consideration. A bridge should never be swung from one abutment except when the lateral is restored and the cuspid used for an abutment.

(f) The periodontal attachment of abutment teeth should be thin and dense and covering the entire surface of the root; the gum tissue firm and pink in color. If the abutment is a vital tooth a receded pulp is the more favorable. Young patients under the age of 15 should never have vital teeth cut into for the purpose of inserting fixed bridgework. Three abutments should never be joined rigidly together to form one bridge, except in the anterior part of the mouth.

*(To be continued.)*

# Reports Presented at Meeting of the Ontario Dental Association

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FIFTY-SIXTH ANNUAL CONVENTION.

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May 14, 15, 16, 17, 1923—*Toronto.*

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## THE DISCIPLINE COMMITTEE OF THE ROYAL COL- LEGE OF DENTAL SURGEONS OF ONTARIO.

R. GORDON McLEAN, D.D.S., TORONTO.

**D**URING the year the duties of the Discipline Committee have been very heavy. We ascribe this possibly again to the financial conditions, which tempted men to do things which they would not naturally do. Their own good sense, ordinarily, would keep them from so acting, but when conditions of financial stress arise, a man is liable to do things that he would not otherwise do. However, we cannot altogether pass over these things.

The activities of the Committee can be classified as follows:

Illegal Practitioners—mostly laboratory men and others without Ontario licenses.

Advertising Practitioners.

Practitioners engaging unlicensed help to operate.

The Committee often finds it very difficult to get the co-operation of those that make the complaints, and we now make an appeal to you to help us get the necessary evidence. This is difficult and disagreeable work at the best, and to get results we must have co-operation from the members of the profession.

When it is known that certain laboratory men are breaking the Dental Act, we think that the least the profession can do to help your Committee would be to send their work to ethical laboratories, of which there are plenty. It is suggested that a list of such laboratories should be placed in the hands of the practitioners.

It is often very difficult to get evidence on certain men known to be practising without a license, as they do it under the cover of legitimate laboratory work. On one case we have in mind we have spent \$50 without being able to get the necessary evidence. This particular man is doing laboratory work for several ethical dentists.

In getting after these men who are practising without a license, it is probably the general opinion of the public that we are doing it for the sake of the dentists. We are doing this for the good of the public—the public are the people who are getting the short end of the stick when men without any experience or training undertake to operate in

the mouth. The Dental Profession has to look after the interests of the public. We feel that the public have the wrong idea, when we undertake to discipline a member of our profession, if they think we are doing it for our own protection.

During the year we have handled seventeen cases; one-third have been convicted and fined, some have promised to reform, and in others we so far have not been able to secure the required evidence.

During the year four men were summoned to appear before the Committee—for improper conduct in a professional respect—in regard to advertising. The order of the Board was:

That such advertisements constitute improper conduct in a professional respect.

That the Board, however, in view of the fact that this and some other concurrent investigations are the first that have been entered upon, do not see fit to make any order of suspension or cancellation.

The Board further puts itself on record that, if any member of the College in the future inserts similar or other objectionable advertisements, he cannot expect that his conduct will be allowed to pass unchallenged.

We now say definitely that the Committee has decided to carry this matter of improper advertising to a positive conclusion. The Board has engaged eminent lawyers who have advised and will still advise them in all matters. It is on their advice that we have not acted on recent advertisements.

This Committee has so far taken no action in regard to the infringement of the Ontario Temperance Act, but members of the profession who persistently break this law may expect prompt action.

We have heard several criticisms regarding the work of this Committee in not going after this improper advertising in a more strenuous manner, but there are many angles that the man on the outside does not know or see. There are many things we cannot tell you, but in the words of Old Bill, "If ye knows a better 'ole, go to it."

I think this is all, gentlemen, that I have to report on this branch of our work. I feel that the work is getting very heavy, and it requires a considerable part of a man's time in looking after the different things that arise. I have several times had patients who have had work done by men who had no training, come to me and ask me to undertake to have these men prosecuted. I have had on several occasions patients come to me complaining that exorbitant fees had been charged them by dentists. In some cases I have been able to get refunds for these patients. You see that this branch of our work is broad in character.

We have many sides of this work to deal with, and as I say, it is not pleasant work. However, someone must do it. The Dental Act gives the profession the right to control the members of the profession, and so the members that are elected to the Board by vote of the pro-

fession in Ontario appoint a committee to undertake this. Some of us unfortunately are placed upon it, and we act to the best of our ability.

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### THE ADVISORY COMMITTEE.

R. G. McLAUGHLIN, D.D.S., TORONTO.

ABOUT six years ago now, at the fiftieth anniversary of the Ontario Dental Society, its attention was brought to the fact that suits had been lodged and were being lodged against the dentists of the Province for alleged malpractice, and that a great many of the men were getting into legal difficulties in other ways. Many of the men thought that this Society should take some action to protect especially the younger members of the profession who would be challenged in this way, who would perhaps become somewhat panic-stricken and make settlements that would be to their own detriment and detrimental to the standing of the profession in Ontario; and so in pursuance of that idea there was appointed an Advisory Committee, whose powers would be advise in matters of this kind. For example, if a dentist were charged with malpractice and threatened with suit, he might refer this matter to the Advisory Committee and get the advice of the Committee and any other assistance it could properly give, but it was understood that the Committee should restrict itself to the matter of advice and not become entangled in any way in the defence of any particular dentist.

The work of the Committee commenced almost immediately, and it had a good deal of work to do along that particular line, from the time of its appointment, and it was very careful that in its advice it would be fair to the public, or the complaining public, as well as fair to the dentist himself. For example, if the Committee felt, on taking the matter into consideration, that the dentist was at fault, that he was really guilty of negligence or showed want of skill, they advised him very frankly in that respect and advised him to make proper settlement. But if they found, on the other hand, that he was unjustly charged, they advised him to stand up and defend himself for the sake of his own reputation and for the standing of the whole profession, because an admission by way of settlement would simply be an admission of guilt on his part.

That work has gone on very smoothly during all these six years, and we have tried faithfully and earnestly to help the men who have brought their difficulties before us, and perhaps I may say in a great many cases we *have* helped. I think we have helped to shut off a great many cases of this character that might otherwise have been brought into court.

Now in presenting this report, we have felt in the last year or two, particularly, the alarming increase in the number of these cases before the Committee, and a great many others that the Committee have no

knowledge of that perhaps have been settled when they ought not to have been settled, or have been brought to trial in the dentist's own locality and frequently have been lost,—very often, we have found out, because of ill preparation, because after all, that is the reason why so many of our cases have been lost,—a want of proper, efficient preparation, before the matter went into Court. In fact, these should be so organized and prepared that they would be practically won before the case went into court.

With the somewhat alarming number or increase in the number of these cases, the Committee is strongly of the opinion that we, as a Dental Profession in Ontario, should organize more strictly than we are organized in this respect, and in that way throw a protection around the members of the dental profession, so that they will not be a mark for an unscrupulous individual to extract \$5,000 or \$6,000 from, on a frivolous or unjust charge. They go after a lawyer who sometimes is willing to take up a charge of that kind and write a threatening letter to the dentist, charging him with malpractice, and threatening him with court proceedings unless he settles for so many hundred or so many thousand dollars.

Now, gentlemen, you know how it makes you feel when you get a letter of that kind from a legal firm. There comes that sinking feeling over you, and you would give anything to get out of the hole you feel yourself in. It is in a case like this where an organization of our kind is of inestimable value, and if we can so organize, the matter of defending the dentist in cases of this kind will not be left to him alone, but will be directed from the central committee, which has at its disposal trained legal advice who will take care of the defence and see that it is properly organized and that justice is done.

If that is the case, you will find that the great bulk of these unjust charges will filter out, that they will never come to court, because it has been our experience, when we have referred our friend to a good legal adviser, a man who has a reputation in the Province of Ontario, that when the complainant finds he has to be up against this legal adviser of known reputation, very often he drops the case.

The recommendation that the Committee bring to you is this: that you empower the incoming committee to take this further organization very seriously into consideration, take the whole matter to the Board of Directors and ask for their practical co-operation in defending the members of the profession in Ontario in all matters of this kind. We feel that after all it is the work of the Board of Directors, even more than it is the work of the Ontario Dental Society. The Board of Directors grants licenses to the young men going out to practise; they have powers of discipline; they say who shall receive a license and who shall not receive a license; and they can say who shall practise and who shall not practise.

Now is it not only natural that they should look at the other side, and that they should throw a line of protection around the young men

who are going out to practise? That is what we want to do, and we ask you to empower the Committee to go before the Board of Directors next week and lay this whole matter before them, and ask for their help in devising some plan whereby the younger men, and the older men too, will not be left to fight this sort of battle, which very often, if left alone to fight, is a losing one.

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## THE RESEARCH COMMITTEE AND CANADIAN DENTAL RESEARCH FOUNDATION.

R. GORDON McLEAN, D.D.S., TORONTO.

WE have not had much financial activity, owing to general financial conditions. It has been hard to get money from dentists, because dentists have had a very hard time to get money. However, we have been carrying on to the best of our ability.

We have during the year received three subscriptions, one from the Manitoba Dental Association of \$200; one from the Calgary Dental Society of \$50; and one from the Dental Study Circle, Montreal, of \$25. Our total subscriptions to date are \$13,354.51. Outstanding contributions to the amount of \$1,064 were paid during the year, and there is still a balance outstanding of \$1,860. In other words, \$11,494.51 has been collected and deposited with the National Trust Company, and we are using the income from that amount.

Now the items we have to report on:

At the last Convention, the Dominion Dental Council made a grant of \$600 to the Foundation, (which has not yet been paid,) with the stipulation that it be apportioned for purposes of dental research among dental colleges in the agreeing provinces. As Alberta did not wish to participate at present, owing to lack of facilities, the Executive have apportioned this between Dalhousie and the Royal College of Dental Surgeons.

Last year we had the usual grant from the R.C.D.S. of \$400.

We had a request from Longmans' Green for permission to use some of Dr. Box's work, as published by the Foundation, in a new text book on Dental Surgery by Sir Francis Collyer, of England.

Dental Summary and a Mexican Journal asked permission to publish some of Dr. Cummer's articles.

Dr. Cummer's articles were also published in The Journal of the American Dental Association.

Requests for Bulletins received from:

Dr. Harold DeW. Cross, Forsyth Dental Infirmary, Boston, Mass.

The Harlem Dental Society, New York, would like to have had 200 copies of Dr. Cummer's Bulletin, so that every member might have one for a course of study.

Dr. I. G. Roberts, Buffalo, N. Y.

Dr. Howard Gallagher, Buffalo, N. Y.

Dr. Howard M. Hall, Kansas, Mo., wanted 200 copies of Dr. Box's Bulletin, to use in connection with his Post Graduate Course.

I am just giving you these to show that the work of the Foundation is being appreciated, and appreciated in a broad sense. I could give you a list from St. Louis to Boston and New York, and the different points of Canada, from where we have had requests for different bulletins that have been published by the Foundation.

### NEW WORK.

We are handing to the members of this Society Dr. Cummer's latest Bulletin, "Combinations as an Aid in the Discovery of Fundamentals in Dentistry and Other Sciences." Every man registering is entitled to a copy of one of these, and those not registering will have one mailed to them.

We feel that the Foundation is doing something for Dentistry that should be deeply appreciated. Research work is the foundation of our profession. The reason that we have fluctuated in our treatments so much in the last few years is because we have based those treatments so much on unscientific bases. The only way we can get those treatments standardized is to back them up with scientific research work, and we have to bank upon the profession to provide the funds to do it with. We have had considerable money given to us in this regard, but I hope we will have considerably more in the future. We really feel it is a most important work in our profession, and, as I said before, it is the basis of it.

Dr. Box has a new bulletin which is in the course of preparation. This bulletin will cost in the neighborhood of \$800 to \$1,000. We have had several men who have come forward, when we have been lacking in funds, and offered us subscriptions, which went in without those men getting much credit for it. Those men are the backbone of the profession—they are putting something into it, and not figuring how much they can get out of it. These bulletins of Dr. Box's will be distributed in the next couple of months, and every member of the profession will have one mailed to him.

\* \* \* \*

### THE COMMITTEE ON PUBLIC DENTAL EDUCATION.

W. B. AMY, D.D.S., TORONTO.

**I** WISH to give you a short report of the activities of a committee appointed jointly by the Board of Directors of the Royal College of Dental Surgeons and the Board of Governors of the Ontario Dental Society, for the special purpose of carrying on an educational campaign.

Recognizing that the press is the most powerful factor in the education of the public, we decided to secure the co-operation of as many representative papers throughout the country as possible.

Nine bulletins written by outstanding dentists were submitted to the

committee. These bulletins were carefully edited and given to the papers, one appearing each Saturday in thirty newspapers for nine weeks.

Another reason that actuated the Committee to launch the campaign was the individual attempts of certain dentists to ostensibly educate the public, but for their own ends. In fact, one of the excuses advanced by one of the dentists was that he was going to educate the public if the dental profession would not.

We judged that the education given by the dental profession as a whole was of much greater value to the public than individual efforts.

We believe that our work has not been in vain, but this we hope is only the beginning of what will be continued next year until the whole public of Canada will know *how* and *why* they should take care of their mouths and teeth.

It was agreed before the campaign was begun that the R.C.D.S. would assume one half of the expense of the campaign, and the Ontario Dental Society the other half. We have spent \$2,099 26 to date.

We hope that this educational campaign will meet with your approval, and that the Board of Directors of the R.C.D.S. and the Board of Governors of the O.D.A. will continue to co-operate along these lines.

\* \* \* \*

## REPORT ON ADMINISTRATION OF SCHOOL OF DENTISTRY.

WALLACE SECCOMBE, D.D.S., TORONTO.

YOU will remember that in the Fall of 1919, 400 returned soldiers and others applied for registration in Dentistry in Ontario, and of these 320 veterans were accepted, and this large class has been with us until this Spring, when they hope to graduate. But this has meant very many serious problems for the Faculty and Board to meet.

It is interesting to note, Mr. President, that the peak of our attendance was in the Fall of 1920. We had then 888 students; the following session, 1921-22, there were 837 students; and this last session 726. A careful estimate has been made of the number of students who will register next year, and it is 476, so that next year we are right back to a pre-war condition, of something less than 500 students. That estimate is made up as follows:

1st year—	58
2nd “ —	58
3rd “ —	84
4th “ —	106
5th “ —	170

Now the total tuition fees of the students during the past session were \$23,000 less than the previous session, and on the basis of the estimated attendance that I have just made, there will be next year a further depreciation in fees of students of \$50,000, compared with this past session.

So that you can readily see, gentlemen, that the Board will be required to meet a very difficult situation in regard to next session, and adjustments will have to be made in the Faculty and in relation to the expenditures on capital account to meet that situation.

Another matter I have been asked to report on is the question of Government assistance. You will remember that when these returned soldiers were with us, in the early days, it was necessary to have an Anatomical Department built in connection with the College, and the Ontario Government made a grant of \$100,000 for this purpose. Since that time there have been annual grants to the College as follows:

1920-21—\$13,029,	1921-22—\$25,780,
1921-23—\$25,000.	

So that in addition to the \$100,000 there have been annual grants amounting to \$63,809, and these have enabled the College to defer the payment of the fees of war veterans in need of financial help. In fact, the entire grants have been expended in that. Promissory notes were taken from the returned soldiers, payable one year after graduation without interest up to that point, and of these amounts so loaned about \$850 have been repaid at the present time. Many of these men have not yet been graduates for one year, and the amounts are not yet due, but it is very interesting to note that as these promises become due, the returned soldiers write in voluntarily and arrange for payment. So that owing to the consideration of the Government we have been able to arrange this for the returned men, and therefore they have been eligible for assistance by the Alumni Association of the University. The University Alumni Association loans to veterans are available only to students in faculties where fees are deferred.

There has been a suggestion by the Board of Directors that as the soldiers repay these loans the money be deposited in a special fund, and the possibility is suggested that such a fund will enable us in the years to come to provide a residence, so that the undergraduates while attending College will have the privilege of living in residence. The Board considers such a forward step essential if we are to surround the students with conditions which will help to mould them into men with good strong rugged characters.

Another question is that of raised standards. Along with other University Dental Departments and Colleges, we have adopted the Pre-Dental standard, so that the dental course now has as its foundation in the University Schools in the United States and Canada, five

years beyond Junior Matriculation. Students outside of Ontario may take first year as Pre-Dental student in a Provincial University. Ontario students are required to take all five years at the R.C.D.S.

In relation to Matriculation, commencing this coming Fall, Junior Matriculants will be required to have twelve papers, including Physics and Chemistry.

The subject of reciprocity with England has already been considered. So many of these returned soldiers desire to return to England to practise, that the matter was taken up, and negotiations are now pending.

There is one other point I would like to say a word upon, and that is the question of Extension Lectures and Clinics, and also that of Post Graduate work.

Regarding Extension Lectures, we believe many dentists do not realize that there is a provision to secure from the College a member of the staff on any subject that licentiates may select, to lecture to the dentists in their local society. There is an honorarium provided by the College, and the only expense to the local association is the transportation. During the past week there were given fifteen lectures:—5 at Peterboro, 3 at London, 2 at Kitchener, 2 at Ottawa, 1 at Simcoe, 1 at Preston, and 1 at Brantford, and the hope is expressed that during the coming year you men will interest the dentists throughout the province, that they may request teachers from the College to come in and take charge of meetings.

A few days ago it was suggested to the Board that these lectures and clinics, instead of being for one evening, extend over a few days, so that the dentists will close up their offices during that time, and concentrate and have a more intensive course on that particular subject.

Regarding the Post Graduate course which is held every Fall, it has been decided to hold this course this year from Monday, the 17th of September, to Saturday, the 22nd. That is the week following the American Dental Association meeting at Cleveland. This will give five full days of teaching, and the following courses will be given. Registrants will be permitted to take the whole course, or part, as they desire.

Course A—2½ days—Preventive Dentistry and Physical Diagnosis.

Course B—2½ days—Pathology and Periclasia.

“ C—2½ “ —Operative Dentistry and Dental Diagnosis.

“ D—2½ “ —Anaesthesia and Oral Surgery.

“ E—2½ “ —Crown and Bridge Work.

“ F—2½ “ —Partial Denture Prothesis.

“ G—5 “ —Full Denture Prothesis.

The fees will be: to those Licentiates of Ontario who are not in arrears with their annual fees, \$10; and to all others \$25.

There is another point, Mr. President, and that is in relation to Convocation. Other years, you will remember, there has been a

special Dental Convocation. This year an arrangement has been made that we will hold our Commencement Exercises, when the L.D.S. title is given to graduates, on Friday of next week, in Convocation Hall. This will not be a University Convocation as in previous years, but the degrees in Dentistry will be conferred at the time of the regular Convocation on the 8th of June.

\* \* \* \*

## REPORT OF THE NOMINATING COMMITTEE.

Hon President .....	R. J. Sprott.
President .....	F. J. Conboy.
Vice-President .....	W. G. Thompson.
Archivist .....	C. A. Kennedy.
Sec.-Treasurer .....	J. A. Bothwell.

## BOARD OF GOVERNORS.

C. E. Brooks.	W. B. Amy.
W. L. Chalmers.	J. C. Devitt.
E. L. Gausby.	O. S. Clappison.

## ORAL HYGIENE COMMITTEE.

F. J. Conboy.	A. W. Ellis.
H. E. Eaton.	F. C. Husband.
	R. Dunlop.

## ADVISORY COMMITTEE.

R. G. McLaughlin.	W. G. Thompson
A. D. A. Mason.	R. G. McLean.
Wallace Secombe.	Harold Clark.

\* \* \*

## Annual Meeting of Board of Directors Royal College of Dental Surgeons of Ontario

THE annual meeting of the Board was held during the week commencing May 21st, 1923, and again for one day during the first week of June.

Reports were received showing satisfactory progress during the past session, and on Friday evening, May 25th, in Convocation Hall, over 300 graduates were granted the title of Licentiate of Dental Surgery. The Rev. Trevor H. Davies delivered the Commencement Address. Twelve dental nurses received graduation diplomas.

The greater part of the time of the Board during its meetings this year was taken up with a consideration of important questions affecting the administrative and educational problems of the School of Dentistry, and particularly as these affect the dental profession in Ontario.

## STANDARDS OF ENTRANCE.

The Board adopted a programme that will raise the matriculation standard of Dentistry in Ontario in 1925 equal to that of Medicine. This standard will require Honor Matriculation, in addition to the Pre-Dental year (adopted two years ago), and will thus be equivalent to two years of college work as required by the State of New York in 1926. The Dental Department of the University of Buffalo has adopted the two year Pre-Dental standard, effective 1924.

## GRADUATE AND POST GRADUATE WORK.

Another important decision of the Board of Directors was to declare in favor of greater development of graduate and post graduate work. It is planned that the College, with smaller undergraduate classes, may so arrange that dental practitioners may be enabled to take courses of either short or longer duration, at a nominal fee. The Board decided that the status of dental practice as a public health service, in the years to come, will depend more upon graduate teaching service than upon any other single factor.

## REGISTRATION BACK TO PRE WAR LEVEL.

The Board was also forced to meet a rather unusual financial situation, owing to the graduation of the abnormally large soldiers' class, with prospects of a first year class of one third the size. This will in effect mean a shrinkage in registration of about 250 students, representing a depreciation in tuition fees amounting to almost \$50,000. This situation was a most difficult one for the Board to meet, and called for rather drastic action in reduction of faculty and readjustment of duties.

## DR. WALLACE SECCOMBE APPOINTED DEAN.

Dean Webster resigned from the active duties of the Deanship and will devote himself to the operative department. Dr. Seccombe was appointed Dean and Professor of Preventive Dentistry. Dr. Webster was named as Honorary Dean.

## FACULTY EXECUTIVE.

The Board named the following members of the Faculty as an administrative committee: Drs. Cowling, Cummer, Graham, McLaughlin, Mason, Paul, Seccombe, Webster and Willmott.

Members of the Executive will act in an administrative sense as chairmen of Faculty Departments, and assume increased responsibility in the teaching and administration of the school.

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THE BUSINESS SIDE OF DENTAL PRACTICE.—Keeping one's own books, if a busy dentist, is needless waste of time and not a saving of expense. Usually they are done at irregular intervals, and hence incorrectly performed. It is cheaper and surer to employ an expert to supervise, and cheaper labor to carry out.—T. W. DAVIE, L.D.S., *Dental Record*.



*BRITISH COLUMBIA*—A. T. OBERG, D.D.S.,  
833 Granville St., Vancouver

*ALBERTA*—JOHN W. CLAY, D.D.S.  
914 Herald Bldg., Calgary

*SASKATCHEWAN*—C. W. PARKER, D.D.S.  
Imperial Bank Bldg., Regina

*MARITIME PROVINCES*—STANLEY BAGNALL, D.D.S., Halifax, N.S.

*MANITOBA*—W. W. WRIGHT, D.D.S.  
767 Warsaw Ave., Winnipeg

*ONTARIO*—Lieut.-Col. W. G. THOMPSON  
28 King St. West, Hamilton

*QUEBEC*—ALBERT DELORME, D.D.S.  
713 St. Catherine St., East, Montreal

THE ALBERTA DENTAL ASSOCIATION, 1923 CONVENTION, JULY 23, 24, 25, 26, 27, AT CALGARY.

THE Biggest and Best-ever Alberta Dental Convention will be held in Calgary on July 23-4-5-6-7.

The Registration and General Meeting will take place on the first day, after which, educational features will form the principal part of the programme.

You will agree that these educational features will be of the highest possible standard, when we mention that the guests for the Convention are to be Dr. Arthur D. Black, Dean of the Dental Department of Northwestern University, Chicago, and Dr. Huston F. Methven, Professor of Prosthetic Dentistry, in the same University.

Dr. Arthur D. Black is the son of the late Dr. G. V. Black, whose works are known to the whole dental world, and he is ably upholding the precedents laid down by his father. He is one of the greatest authorities on Operative Dentistry, Dental Pathology, and its kindred subjects.

Dr. Huston F. Methven has been for years a teacher in the Northwestern University and his reputation has been built up chiefly as an expert in Prosthetic Dentistry, in which he has no superior in America.

We would strongly urge you to avail yourself of the opportunity of hearing a series of lectures and demonstrations from such acknowledged authorities on two of the most important branches of dentistry, and we can assure you that you will never regret spending the time and the money necessary to attend these lectures.

The pleasure side of our Convention necessarily takes second place, but it will not be neglected. As usual, we will hold our regular golf tournament for the Ash-Temple Cup, and our annual banquet will not be the least pleasing function of the occasion.

Some of our visitors will be motoring in for the Convention, and for their information we wish to mention that the new Banff-Windermere

Road will be opened this summer, and no finer vacation can be conceived for a motorist than a tour over this magnificent and most picturesque circle highway.

We cordially urge you to come to our Convention this year. Make your arrangements now to be here. You will benefit immensely educationally, and we will do our best to make sure that you enjoy yourself to the utmost degree. Arrangements have been made for the entertainment of the ladies as well, so bring your wife along.

P. G. ATKINSON.

*Chairman, Convention Publicity Committee.*

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## SASKATCHEWAN

### 1923 ANNUAL CONVENTION

SASKATCHEWAN'S Annual Convention met in Elrose Hall, Regina, May 31, June 1 and 2, with President Dr. C. W. Parker, presiding.

The attendance was if anything larger than had been expected, being in this respect the second largest convention in the history of the organization.

Members were present from all parts of the Province and came prepared to give three days of their time to an intensive study of those practical problems which we all meet in our every-day practises.

Drs. M. H. Garvin and H. J. Merkley of Winnipeg were the special lecturers for the meeting and handled their subjects with despatch and in a manner that was both interesting and profitable.

Dr. Garvin went fully into the subjects of "Office-Management" and the "Root-Canal Problem," while Dr. Merkley devoted his lecture periods to "Full Denture Work" and "Anaesthesia."

Saturday was devoted to a series of table-clinics. These were handled by Drs. Dyer, Gitterman, Johnson, Dixon, Harwood, Robb, Smale and Switzer.

The convention placed itself on record as being in favor of a revival of the Western Canada Dental Society and advocated the holding of it every third year in the Prairie Provinces alternately, and that the province in which it is held each year withdraw its own convention and throw its weight behind the larger meeting.

Moose Jaw was selected as the next place of meeting with the following officers:—

Pres., DR. J. SILKNITTER, Moose Jaw,  
Vice-Pres., DR. G. L. CAMERON, Swift Current.  
Sec.-Treas., DR. J. PLUNKET, Moose Jaw.

The following members registered:—

Chas. W. Parker .....	Regina	R. I. Hotham .....	Strasbourg
C. H. Weicker .....	"	J. A. McConghey .....	Melville
Grace C. Armstrong .....	"	G. E. H. deWitt .....	Regina
R. Lederman .....	"	S. Goodman .....	Gravelbourg
W. McDonald .....	Yorkton	W. G. Wallace .....	Lafleche
R. J. Pennel .....	Prince Albert	M. Anna Munroe .....	Davidson
V. Rondeau .....	Rouleau	T. W. Beach .....	Moosomin
F. C. Harwood .....	Moose Jaw	H. R. Day .....	Rocanville
R. E. Smale .....	Regina	Harold Johnson .....	Moose Jaw
J. A. McGregor .....	"	S. R. Martin .....	"
David Barnes .....	"	H. W. Dixon .....	Cabri
R. Ross .....	"	J. K. Brimmacomb .....	Weyburn
A. F. Dyer .....	"	Cal. Bricker .....	Grenfell
F. S. VanWoert .....	"	M. R. Parkin .....	Regina
H. B. Gorrell .....	Minnedosa	S. J. Burns .....	"
Jas. C. Clermont .....	Moose Jaw	J. E. Rundle .....	Moose Jaw
R. H. Grant .....	Regina	F. D. Fasken .....	Regina
F. G. Switzer .....	"	H. M. Schwitzer .....	"
C. Mooney .....	"	A. G. Smith .....	"
E. C. Campbell .....	Saskatoon	A. J. Brett .....	"
D. J. Ferguson .....	"	B. I. Gitterman .....	"
E. W. Mounteer .....	Regina	W. R. Watchler .....	Yorkton
G. T. Cameron .....	Swift Current	Arthur Johnson .....	Moose Jaw
W. Ibberson .....	Saskatoon	S. Moyer .....	Rosetown
P. W. Winthorpe .....	"	F. G. Moore .....	Balcarres
H. G. Carson .....	"	D. J. Brass .....	Yorkton
W. H. Ross .....	Regina	L. D. Steele .....	Regina
Irwin Robb .....	"	J. A. Plunkett .....	Moose Jaw
W. F. Smith .....	"	W. H. Leitch .....	Regina
J. Silknitter .....	Moose Jaw	B. A. Dixon .....	Moose Jaw
C. C. Rowe .....	Regina	W. W. Irwin .....	"

**TOXICITY OF COCAINE.**—Cocaine solutions injected into the tissues produce typical local and general effects. Locally cocaine possesses a definite affinity for the peripheral nerve endings; it causes constrictions of the smaller arteries producing slight anemia in the injected area with diminished action of the leukocytes. If cocaine in sufficient quantities is absorbed by the circulation, general manifestations are produced from bringing other tissues in close contact with the poison. The principal disturbances of the central nervous system make themselves known by vertigo, very rapid pulse, enlarged and staring pupils, and difficult respiration.—L. R. GANS.

**KEEPING CLASPS FROM WEARING TEETH.**—If patients will take the end of a match stick and polish the inside of their clasps with bicarbonate of soda, they will not have the enamel wear. I have seen clasps worn for fifteen years without the slightest sign of abrasion, and in every instance the patient had kept the clasps clean with bicarbonate of soda or some tooth paste. No doubt in the future we shall hear a great deal about loss of teeth on account of clasps, but it will be due mostly to the fact that the patient did not receive the proper instruction as to the cleaning of them, and again to the fact that the dentist does not observe the fundamental principles of clasp construction. Most of the modern clasps are so rough on the surface next to the tooth that it is almost impossible to keep them clean.—*Dental Cosmos*.

## JUVENILE JINGLES

*Contributed to ORAL HEALTH by Dora L. Cameron,  
Wenatchee, Wash.*

### Neglect

Suppose a pretty little house  
Had broken panes of glass;  
Had curtains dirty, too, and frayed,—  
Why, people, as they pass,  
Would shake their heads and say, "Too bad!"  
And "Isn't it a shame?  
Why don't they put new curtains up?  
Replace each broken pane?"

Suppose a pretty little maid  
Would let her teeth decay,  
Let dirty film cover them,  
Neglect them every way,—  
Oh, wouldn't it be very sad,  
And to her sorrow bring?  
For, to neglect one's precious teeth  
Is just a dreadful thing.

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### Your Jewel Box

You have a "jewel box" in your head,  
All padded up and lined with red,  
And you will find, when six years old,  
Just twenty pearls that box will hold.

While other pearls will soon appear,—  
Much larger ones,—remember, dear,  
That baby pearls are jewels rare,  
And need the very best of care.

So let no dirt get in that box,—  
Shut tight your lips like safety locks.  
If you'll be happy boys and girls,  
You'll prize and keep those precious pearls.

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### Little Windows

My eyes are windows open wide  
Except when I'm asleep;  
There's nothing that I do not see,  
As here and there I peep.

But mother says some things are wrong,  
That I am not to look;  
But shut my eyes as quick as wink,  
Tight as you'd shut a book.

For if I keep those windows clean,  
Then shall I always see  
The pure and lovely things in life;  
How careful I must be!

# MULTUM IN PARVO

This Department is Edited by

C. A. KENNEDY, D.D.S., 2 College Street, Toronto

HELPFUL PRACTICAL SUGGESTIONS FOR PUBLICATION, SENT IN BY MEMBERS OF THE PROFESSION, WILL BE APPRECIATED BY THIS DEPARTMENT

**PSYCHOLOGY IN DENTISTRY.**—It is certain that psychology is a great help in dentistry. If a nervous or suffering patient, or one with St. Vitus' dance or anything else, presents, the following method is well worth trying: First make conversation about anything but the teeth. If you can't do this, learn how. Talk sensibly about pleasant things while washing your hands, etc.; in other words, get acquainted. She may think you are a demon, as many think a dentist is. She will soon decide that you are a human being after all, even though a dentist. Finally, when you are ready, ask about her "troubles." After she tells you, say something like this: "Now, if the tooth is sore, we must be slow and careful with it." Then start as you said you would. She will soon have your confidence and you will be working much faster. Slow actions and slow work at first count here. Try it. Do not use the word hurt at any time. By slow and gentle action and words, you can prepare cavities in very sensitive teeth instead of resorting to desensitizing treatments, for which you usually get little or no compensation.—C. W. GARLEB, *Dental Digest*.

**THE BUSINESS SIDE OF DENTAL PRACTICE.**—I mentioned punctuality, and this of course is one of the great principles in modern business methods—one that we, as dentists, are very prone to ignore. Single control and working of a practice tends to slipshod making of appointments, and this is responsible for a great deal of the unpunctuality. Some dentists make a point of collecting patients in their waiting-room, under the erroneous impression that it is good business, deluding the patients that they are busy. Patients are not so readily taken in, and it is obvious to them that there is slackness somewhere. The waiting-room should only be used as a clearing room. It is up to the dentist to show the example to his patients, and he will soon find them arriving punctually. It is our own experience now to have them coming five or ten minutes before their appointed time. This is, of course, the outcome of our careful recording and listing of times needed for the various classes of work, so that fairly accurate appointments are made.—T. W. DAVIE, L.D.S., *Dental Record*.

# THE COMPENDIUM

This Department is Edited by  
THOMAS COWLING, B.A., D.D.S., Toronto

A SYNOPSIS OF CURRENT LITERATURE RELATING  
TO THE SCIENCE AND PRACTICE OF DENTISTRY

## SOME CLINICAL NOTES.

IN a paper read before the Liverpool and District Odontological Society, November, 1922, Joseph A. Woods, M.D.S., presents some data from his records of private practice, extending over twenty-eight years. Dr. Woods makes a plea for a more careful treatment of our clinical experience; they should be treated, as far as possible, with the same scientific methods as are applied to laboratory experiments. Such questions as the average period of functional activity of a crowned tooth; the average period of usefulness of a devitalized tooth, as compared with one treated for alveolar abscess—these questions, together with many others, should be discussed fully from the clinical standpoint.

Any deductions, to be really valuable, would have to be founded on the analysis of a very large number of exact facts, recorded on a uniform plan, and allowances made for varying clinical conditions, both at the time and afterwards. Not only should accurate records of operations be kept for the purposes of business records, but also for scientific purposes. If a system of chart and symbol be adopted, these records may be made with a minimum expenditure of time. A separate chart is used for each patient, and these charts are put away in a suitable filing cabinet. The correct dental history is always before the operator; it may also indicate possible future treatment, as well as being a great help in accurate diagnosis. From these records it is possible to determine, with fair accuracy, the behavior of various filling materials, duration of crowns, life of pulpless teeth, and many other similar things.

The following are some of the results submitted by Dr. Woods:

Out of sixteen silicate cement (Shoenbeck's) fillings, inserted for ten patients, the average life was nine and a half years. In six cases the fillings are still in use and do not require renewal, although they have been in for from nine to fourteen years. All but two of the sixteen fillings were in interstitial cavities in the upper anteriors, but two were in molars and show only surface wear, after nine and four-

teen years, respectively. This tabulation shows that the silicates have a possibility of long service under favorable circumstances.

Regarding gutta-percha, Dr. Woods reports: "No material seems to have greater powers of resisting further caries and its use in suitable cases has, I believe, much to recommend it. Especially have I found it satisfactory in small interstitial cavities in upper and lower incisors in young subjects, and in buccal cavities in molars. My records show cases where gutta-percha fillings have been in for eighteen or more years and are still giving good service. Out of sixteen fillings which I have examined recently (in ten patients) the average duration was about sixteen years; in the other eight cases, the original fillings are untouched after from seven to eighteen years; in the other eight, they have been replaced by silicate fillings. In one patient, four gutta-percha fillings in lower incisors, put in nineteen years ago, are still in good order. At the time that I treated her I feared that she would not retain the teeth very long, as she was passing through a period of very active caries, from which she lost a number of teeth."

Porcelain inlays proved satisfactory, some giving good results for upwards of twenty years.

Many fillings of mat gold have stood the test very well, after a period of eighteen years. Most of the fillings were in molar cavities.

Gold crowns have shown in some cases a durability exceeding twenty-five years.

Cast gold inlays, being fairly recent in introduction, are not commented upon.

Oxy-phosphate of zinc cements generally washed out in the course of two or three years, although exceptional cases lasted much longer. In one instance, all the fillings washed out in one month. Dr. Woods finds that "if the cervical portion of the filling has been satisfactorily inserted (as to dryness, solid packing, etc.), it does not dissolve more quickly than the rest of the filling."

In the discussion of this paper, the opinion was generally expressed that the method of cavity preparation had much to do with the results obtained from any filling material. This was particularly the case with amalgam fillings. The gutta-percha fillings, even if they presented dark surfaces and ragged edges, still had the advantage of durability in most cases. The porcelain fillings, with their poor color and edge strength had proven inadequate for general use. The silicate fillings, if properly prepared, have displaced the fused porcelain inlays in many cases.

# ORAL HEALTH

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TORONTO, JUNE, 1923

No. 6

## EDITORIAL

### How Best to Defend the Dentist Against Unjust Charges of Malpractice

**T**O-DAY this has become a serious problem. A problem, indeed, that demands the earnest consideration of the whole profession. However, if the question be wisely and energetically dealt with, many hitherto embarrassing situations may in the future be averted.

Some six years ago this matter was brought to the attention of the Ontario Dental Society in convention, and a committee was appointed to be known as the "Advisory Committee," whose instructions were to take into consideration any such case referred to it where the honor and reputation of the practitioner were assailed. The duties of the Committee were strictly limited to giving advice only, and in no case, was it to appear publicly as taking part in the defense.

Though limited in scope, this method of giving assistance has proven of considerable value to many members of the profession.

Recently, however, the Committee has been so impressed with the increasing number of such cases in Ontario, that it felt some plan should be evolved to enable the profession to more effectually grapple with this growing menace. That in some way a stronger defence

should be thrown round the members of the profession who are constantly in danger of such malicious charges.

The first definite step in this direction was taken at the recent convention of the Ontario Dental Society, when the "Advisory Committee" was instructed to seek the practical co-operation of the Board of Directors of the R.C.D.S. in evolving and putting into operation a plan whereby it would be possible to establish a central Council or Committee of advice and defence to which all charges affecting the honor and reputation of the dentist might be referred.

The duties of this Central Council would be, not only to advise as in the past, but if requested, and it were thought wise, would undertake to retain legal counsel and conduct the defense, the legal costs of such action being paid out of the central fund contributed to and set apart for this purpose.

This is an ideal plan to which the profession should earnestly set itself. Under such a plan the individual practitioner (inexperienced in such matters) would not be left to work out his own defense but the whole profession represented by this central Council, would relieve him of such an ordeal.

The effect of such concerted action would be two-fold. It would prevent in many instances the accused dentist being stampeded into making foolish settlements in order to avoid embarrassing publicity in the courts. Also very many unfounded and frivolous charges would never get past the embryonic stage when confronted by an organized and determined defence.

Some such plan is now under the serious consideration of the joint "Advisory Committee" of the Ontario Dental Society and the Board of Directors. And there is no doubt with the hearty and practical co-operation of the profession, such a central Committee of Defense as outlined would prove a real asset to the Dentists of Ontario.

R. G. McL.

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## American Dental Golf Association

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THE fourth annual tournament of the American Dental Golf Association will be held in Cleveland, Monday, September 10th, 1923.

Banquet will be held Sunday, September 9th, in "Rainbow Room," Winton Hotel.

Many events are planned, prizes donated and the usual fellowship anticipated.

Make reservation now and for any particulars communicate with

J. A. LOUGHRY,  
*Sec.-Treas., 1311 Schofield Bldg, Cleveland, Ohio.*



W. J. BRUCE, L.D.S., D.D.S.,  
VANCOUVER, B.C.

*Chairman Executive Committee,  
Canadian Dental Association.*

*The Eastern Man's Prayer*

THERE was a Wise Man in the East whose constant prayer was that he might see to-day with the eyes of to-morrow.

# ORAL HEALTH

A JOURNAL THAT STANDS FOR THE "OUNCE OF  
PREVENTION," AS WELL AS THE "POUND OF CURE"

VOL. 13

TORONTO, JULY, 1923

No. 7

## Presidential Addresses---Canadian and Ontario Dental Associations

CANADIAN DENTAL ASSOCIATION, H. F. WHITTAKER, D.D.S.,  
EDMONTON, ALTA.

ONTARIO DENTAL ASSOCIATION, R. J. SPROTT, D.D.S.,  
BARRIE, ONT.

*The Presidential Addresses delivered at the last Conventions of the Canadian and Ontario Dental Associations, by Drs. Whittaker and Sprott, covered many important questions affecting the welfare and advancement of the Dental Profession.*

*As these two excellent addresses dealt with somewhat similar problems, we have made rather extensive resumes, and now publish them as companion articles.—EDITOR.*

### PRESIDENT'S ADDRESS, CANADIAN DENTAL ASSOCIATION.

DR. WHITTAKER, at the outset of his address, expressed deep regret on behalf of the Dental Profession in the loss of two of its brightest and biggest men, in the persons of Dr. Frank Woodbury and Dr. Harry Abbott, and recounted in detail their many outstanding services to Canadian dentistry, expressing the thought that their hosts of friends at the Canadian Convention would miss their friendly smile and hearty handclasp, and that their guidance and wisdom would be regretfully desired in the deliberations of the gathering.

*Post-Graduate Work.*

Regarding post-graduate work, Dr. Whittaker reported as follows: "Never in the history of the dental profession, or any other, has there been so much stress laid upon post-graduate work as during the last four or five years. But this has not been an unmixed blessing, as we have suffered to some extent from too much zeal along this line, and have been hurried into new and untried places without due consideration. We cannot hope to keep up with the advance in our work without these aids, but should there not be some means to prevent untried and unproven theories being given broadcast to us?"

"In some cases men have made it a business to travel up and down the land propounding their message, who have not given it the acid test of sufficient trial in practice, or have advertised their ideas or methods to the public through the press, and, probably without intending to do so, have frightened the people into demanding of their dentist services not required by their needs.

"This condition, no doubt, has been brought about by the race for the high tuition fees obtainable for their post-graduate courses. Years ago, when a member of a profession discovered or worked out something of benefit to his profession or the public, he gave it to them through the medium either of his college, professional journals, or conventions, and did not expect to commercialize it for his individual benefit. Perhaps they were wrong, but their memory has lost nothing by it. I do not wish you to believe that I do not hold the laborer worthy of his hire, or that these men, who through years of hard work and study have brought dentistry a lasting benefit, are not entitled to material profit as well as the honor due them, but I do think that in the immediately preceding years, to a greater extent than is good for us, men have made a business, and a very profitable business, of organizing and exploiting post-graduate courses—men whose first aim and object has been the almighty dollar.

"It seems to me that the proper place for post-graduate work lies with our dental schools and colleges, and for those who are not able to attend regular courses, a system of extension departments might be established, somewhat after the plan adopted by our western universities in other branches of study.

"Another field for this work lies with our conventions, study and clinic clubs, but all such courses should be under some recognized authority.

*Co-operation.*

"In the past few years the spirit of co-operation between the medical man and the dentist has grown stronger. This is very desirable, and will continue increasing, to the lasting benefit of both, and more so to the public for whom both professions exist. We have very much to learn from our medical brother, and we can at least

balance this account in our assistance to him when working side by side.

"But there is another aspect of co-operation that I wish to mention, and to ask careful consideration for all—that is the co-operation between members of our own profession. Let us get away from the old idea of opposition, and get the better, brighter light of co-operation; let us consider the man across the hall, across the street, or down the block, not as a rival, but as one that we can appeal to for help and inspiration, one that we can take our troubles and problems to for help in solution, and to whom we will be more than pleased to render the same services. Also, let us get the broader vision that our patients are entitled not only to all the knowledge and skill we may have, but to that which, through the exchange of methods, other men may possess.

#### *Dental Legislation.*

"Dental legislation in the Provinces of the Dominion seems to be on a very unsound basis. Legislators are given to look upon dental laws as for the protection of the profession, instead of, as they rightly should be, for the safeguarding of the public. Dental laws, in place of being used for the betterment of dental standards and conditions, are often, for political purposes, made to work real damage to the public by the licensing of the under-qualified men. The Legislative Committee of this Association has a broad field and a big opportunity for work in helping to bring about throughout the Dominion better and more uniform laws.

"I further recommend that this Committee give careful study and consideration to the question of the Government Income Tax, as applied to the profession, with a view to obtaining changes in its administration, for the removal of unjust charges, and the obtaining of concessions already granted the business man, but now denied to the professional man."

#### *Dental Education.*

Dr. Whittaker referred to Oral Hygiene work throughout Canada, and commended the effort of these agencies during the past year, urging the need of public education regarding dentistry as a health service, and continued:

"Since our last meeting the majority of the dental schools and colleges in both Canada and the United States have announced the adoption of the Pre-Dental Year. This is a long step in the right direction, and will no doubt bring lasting benefit to both the profession and the public, for dentistry cannot claim nor receive its proper place among the learned professions or in the minds of the people until its members are qualified educationally to stand with the highest. But while our future dentists cannot be too highly educated, I wish to suggest that the public is also in need of dental education, and must be shown, not only the benefits, but the necessity of dental

services; what it means in health and comfort, and also what improvement in dental conditions means in increased efficiency, and in actual saving to the individual and the community as regards material wealth. The public must be taught that, from childhood up, human beings cannot give their best under the handicap of dental diseases; also that the replacement of lost dental organs cannot take the place of the healthy tooth itself.

"When we realize that there is but one dentist in Canada to every 3,047 people, we know that the public as a whole is not obtaining the services it should. It is stated that but 25 per cent. of the population ever receive dental aid.

"This condition is not confined to any one locality or province, though we find that the ratio varies considerably in the different provinces. According to figures received from the Dominion census and the reports of the secretaries of the provincial associations, Ontario leads, with one dentist per 2,171 of population; British Columbia, 2,255; Nova Scotia, 2,732; Alberta, 3,233; Manitoba, 3,503; New Brunswick, 3,528; Saskatchewan, 4,614; Prince Edward Island, 4,659; and Quebec, 5,208.

"How often has the question been asked: 'Are there enough dentists in Canada?' If we are to confine our services to the 25 per cent. of the people, the answer is yes. If we are to reach out and serve the other 75 per cent., there can be no two opinions—the answer is no. How are we to reach the other 75 per cent.? Why do they not avail themselves of the services of the dentist? It surely is not because they are not in need of such services. Then, is it because of the cost to them? Perhaps both.

"Dental education of the public will greatly overcome the first reason, but what about the second, the matter of cost? To my mind, one of the biggest problems before you to-day is the matter of the cost of dentistry to the people. Conventions such as this, and post-graduate classes, make us better dentists, but is it not a fact that each new step, each new and better method, but adds to the cost of the service to the patient? Let us consider how we can make it possible for the majority, the 75 per cent., to receive adequate dental services at a reasonable outlay, without sacrificing the high standards we have set for ourselves.

#### *The Canadian Dental Research Foundation.*

"The Canadian Dental Research Foundation has been very active during the past two years, and is doing a work that should demand of the entire dental profession both moral and financial support to the greatest extent.

"The funds of the Foundation have been increased by several thousand dollars since you received their last report, but are still very far from reaching the objective set. It will need hard personal

work on the part of many men throughout all the country to build this fund to the point where the future of the work is assured.

"The report of the Committee will be received later during the Convention.

*Dentists and Citizenship.*

"It is nearly two years since the Canadian Dental Association met in convention in the city of Ottawa. These two years have been years of stress and readjustment, and the dental profession has not been exempt from the trials and discouragements of that period any more than its sister professions, or the business interests of the country; neither have its members shirked their duty in the work of helping Canada on its way back to peace conditions. In our zeal as practitioners we have not forgotten that we are also citizens."

Dr. Whittaker, in opening his address, extended a cordial welcome to the ladies, our friends from the United States, the essayists, clinicians and other guests, and in his closing remarks expressed the thanks of all present to those taking part in the programme, and to the officers and committees for their good work.

\* \* \* \* \*

PRESIDENT'S ADDRESS, ONTARIO DENTAL  
ASSOCIATION.

**D**R. SPROTT, in opening his address, gave a brief outline of the past developments of dentistry and the present tendencies, and continued:

"Not many years ago dentistry was largely a reparative art. We have arrived at a time when it is vastly more. It is not satisfied to continue as formerly. There was a long period of reparative construction based upon the application of art and science. Wonderful progress has been made in this sphere of dentistry, and while a wider and vaster scope has been opened up, the reparative art still remains, and should have the best effort of the profession in its application; and while we must of necessity continue to teach and practise this phase of dentistry, we are making substantial advancement in a greater and broader sphere.

"Whatever may have been the attainments in producing mechanical appliances for dental restorations, and producing better operative technique, the goal of better dentistry is to establish prevention. The old adage that 'an ounce of prevention is better than a pound of cure' is not more fitting anywhere than here, and it is obviously the paramount duty of every dental practitioner, while daily engaged in the performance of restorative operations and operative technique, to work to the end, and keep in view, that preventive dentistry is in a large measure attainable.

*Preventive Dentistry.*

"The relation of diet to development of sound teeth and absence

of caries has come as a revelation of what may be accomplished by the use of foods that contain a proper balance of tooth-producing materials. This subject is worthy of the closest investigation and study. The dentist should be in a position to advise mothers as to what should constitute a properly balanced diet during the pre-natal period, as well as in early childhood. Little opportunity has been afforded the average dentist heretofore in a systematic course of study in this subject, and so far there does not seem to be any authoritative work recommended, so that the profession at large may have a concrete course of instruction to aid in this very important subject."

Referring to the publication of Bulletins by the Canadian Dental Research Foundation, Dr. Sprott stated that very valuable results have been attained by those who have followed research work, and by having presented to the dental profession by a series of bulletins the results of investigation of the Committee on Research, very valuable information has been placed before us. This work, which is of interest to everyone, and necessarily of valuable assistance in promoting practice which is in advance of that which has formerly obtained, is deserving of liberal support, as without funds the work of the Committee on Research would be handicapped.

#### *Post Graduate Work.*

"The willingness of the Board of the R.C.D.S. to co-operate with dentists throughout the province by sending a clinician to any centre to present a clinic to any group of dentists, does not seem to have been taken advantage of as it might have been. This method of bringing instruction to the dentist in his own office, and upon patients of his own selection, should stimulate an endeavor to a better technique, and a better treatment than is often practised. It would also have a beneficial result in bringing all the local practitioners together, thus developing a more progressive attitude and interest in office practice."

#### *Public Education and the Press.*

Dr. Sprott drew kindly attention to those agencies at work for Oral Hygiene in the Province, and stressed the matter of public education in the following words:

"If the best work of the profession is to be accomplished, and by that I mean the greatest service rendered to those in need of dental treatment, it must be done by educating the public. Just how this can be done so as to reach the greatest number and to remove educational propaganda from anything that may appear to the public mind as advertising, is a problem in itself.

"The Board of the R.C.D.S. has combined with the Ontario Dental Association, each contributing an amount for the purpose of putting on an educational campaign. This has taken the form of bulletins in the daily press, and no doubt these are widely read. If

this can be kept before the eyes of the public long enough, it will have results, but it is expensive, and therefore can be carried on only to a limited extent. Information of an educational nature could be carried to the public by members of the dental profession, and at a cost that would not be burdensome to anyone, by each dentist distributing among his patients, in pamphlet form, such information as might be prepared and recommended.

"It is beyond doubt that patients read any information recommended and presented to them, provided it is direct and to the point. At the present time the public is in a mood to ask questions. Patients are seeking information. If the dentist can supplement what he has opportunity to explain, by presenting information in a short pamphlet, which the patient can take away and read at his leisure, and carry into the home, a vast amount of educational work can be carried to a great number of people.

"Advantage might also be taken of the moving picture theatres. Already much is done in presenting to school children some of the subjects in the school curriculum. Bulletins could be made use of in the same way that would make an impression on the mind. Courses of lectures could be arranged for in hospitals, to nurses in training. This is, perhaps, done in some hospitals, but there are many in which little is taught. Nurses should know something of the dental diseases and the necessity of proper diet for children in building up tooth tissue, both in the pre-natal period and after birth. They should know something of the effect of diet in relation to caries. Much has been accomplished in school clinics by the school nurse, but we are only on the threshold of what should be done. In short, the greatest need of the public to-day in the realm of dentistry is the duty of the profession to supply that need.

#### *Saner Methods of Practice.*

"During the last few years there has been a tendency to stabilize methods of practice. With the use of the X-Ray and its advantages, there has been a decided improvement towards better operative dentistry. The teaching given recent graduates has done much in developing better operative technique, and the splendid clinics presented in our recent conventions have also done much to improve the standard of our work. Radical treatment has given place to more sane methods, and, taking an average, better dentistry is the result."

The question of reciprocity in Dental Licenses was urged in the following words:

"In effecting reciprocity the Board of the College will have accomplished something that will tend to open a wider field for students and graduates of our College, and place the status and high efficiency of the dental profession in Canada, and especially in Ontario, before the people of Great Britain.

*Government Assistance.*

"The interest taken by the Government in the finance and welfare of the Royal College of Dental Surgeons and its students is greater than that generally known by the profession. During the past year a grant of twenty-five thousand dollars was made to assist in carrying on the work of the College. This assistance is thoroughly appreciated, and has been of material help in enabling the College to finance its affairs at a time when the amount derived from students' fees is declining and the College is adjusting itself to present conditions."

Dr. Sprott welcomed the ladies, visitors and guests, and concluded by expressing sincere thanks to all of the Convention Committees, the Association Officers, and the Board of Directors of the R.C.D.S., for their contributions toward the great success of the Convention.

## Fixed and Removable Bridgework

BY I. H. ANTE, D.D.S., TORONTO.

(*Continued from June issue.*)

- B.** (9) Abutments for bridgework. The abutment restorations must fulfil certain definite requirements:
- (a) The preparation must be made with the minimum of tooth mutilation.
  - (b) Protection of the pulp against thermal and galvanic irritation by eliminating large metallic fillings.
  - (c) Use of a gold and platinum alloy which will make thin but tough castings.
  - (d) Adaptable to a vital tooth and requiring no anaesthetic for preparation; capable of successful construction by the average dentist; capable of successful cementation, and avoidance of splitting the tooth.
  - (e) Correct anatomical restoration of tooth from marginal ridges, sulci and proximal contact.
  - (f) Attachment to the tooth so closely fitted and perfectly adapted as to avoid mechanical irritation.
  - (g) Sufficient extension of cavity to prevent occurrence of decay.
  - (h) Good aesthetic appearance. No display of gold should be produced.
  - (i) Parallel axial walls of preparation which will permit of withdrawal of the abutment and will afford maximum of frictional retention and resist against vertical stress, labial, anterior and posterior stress.

The real retentive feature of an abutment answering this requirement is found in the tenso-frictional resistance to displacement or correct adaptation of a hard material against opposing and nearly parallel axial walls, and the longer and broader those walls, the greater the resistance to displacement. At the same time, the further those walls are kept from the pulp, the less will be the irritation to that pulp. Also, the use of one or two intra-dental pins will obviate the needless sacrifice of tooth tissue.

I believe that if a fixed bridge is to be a success, the abutments should be so constructed as to hold that bridge so firmly in position that it may be used in normal mastication for an extended period without cementation.

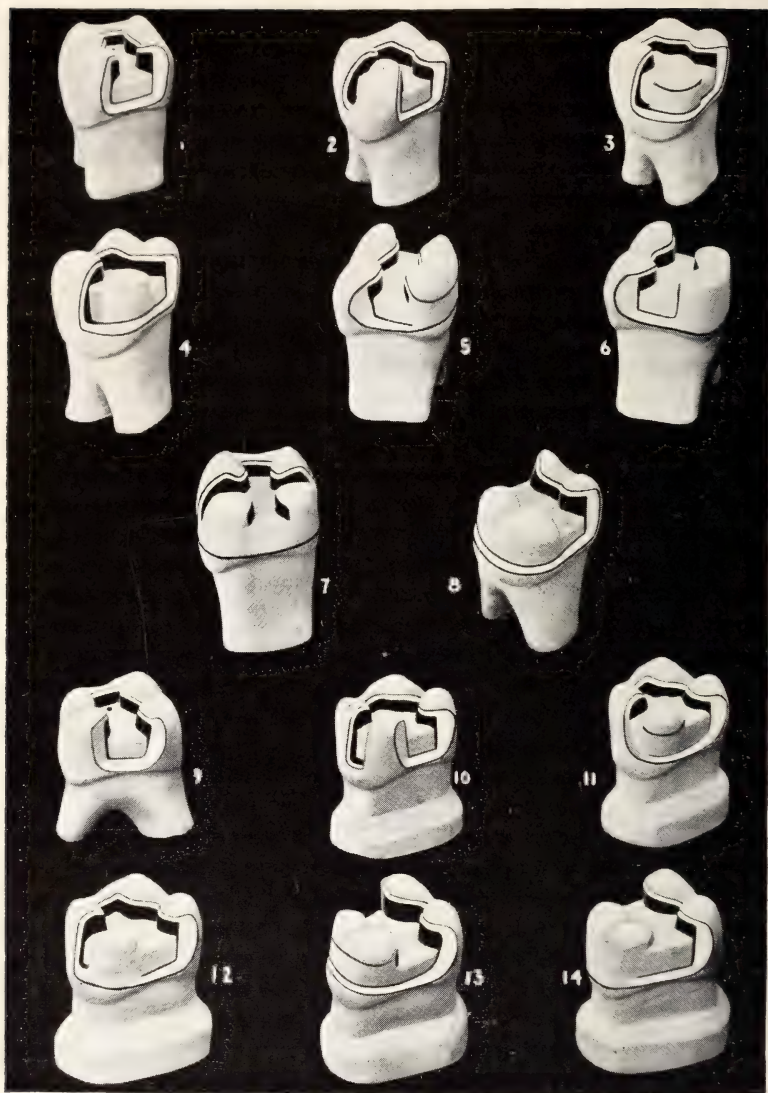
It is also essential to differentiate between abutments, which are of two classes—retaining and supporting abutments. A retaining abutment retains or holds the bridge in position, while a supporting abutment supports the bridge but does not retain it.

In supplying one dummy involving the bicuspid or molars, absolute fixation at one end only, and a strong recessed rest in the supporting abutment piece upon the other end, will usually prove adequate in so far as stability is concerned, and advantageous to both abutment teeth by permitting them to function more or less independently of each other, while still successfully carrying the burden of stress. The retaining abutment should be the stronger of the two teeth, and the supporting abutment should be substantial. The occlusal rest should extend well into the occlusal surface to prevent tipping, or be interlocking to give stability to the restoration.

I shall try to present a brief classification of conditions which determine what type of abutment I believe is indicated for those conditions. This is simply a guide to point out the various types of cases which present in practice, and types of abutments which experience has shown will best take care of them. It is also understood that practically all of these abutments are constructed on vital teeth, but may be used with or without posts on pulpless teeth.

In cases where anterior teeth present proximal cavities, the decay should be removed and the cavities filled with cement, and the abutment preparation made in this. After the bridge is set, any of the cement that is exposed on the labial surface is removed, and a proper cavity cut and filled in with gold foil or silicate filling.

If the anterior teeth present proximal foil or silicate fillings, not involving the angle, which are perfectly preserving the teeth, the preparation is made without removing the fillings. If the proximal fillings involve the angle, we remove them and make as nearly the typical preparation as the conditions found will permit. If any abutment contains large fillings or inlays, it is well to thoroughly examine, and in doubtful cases remove these restorations before proceeding with the abutment preparation.

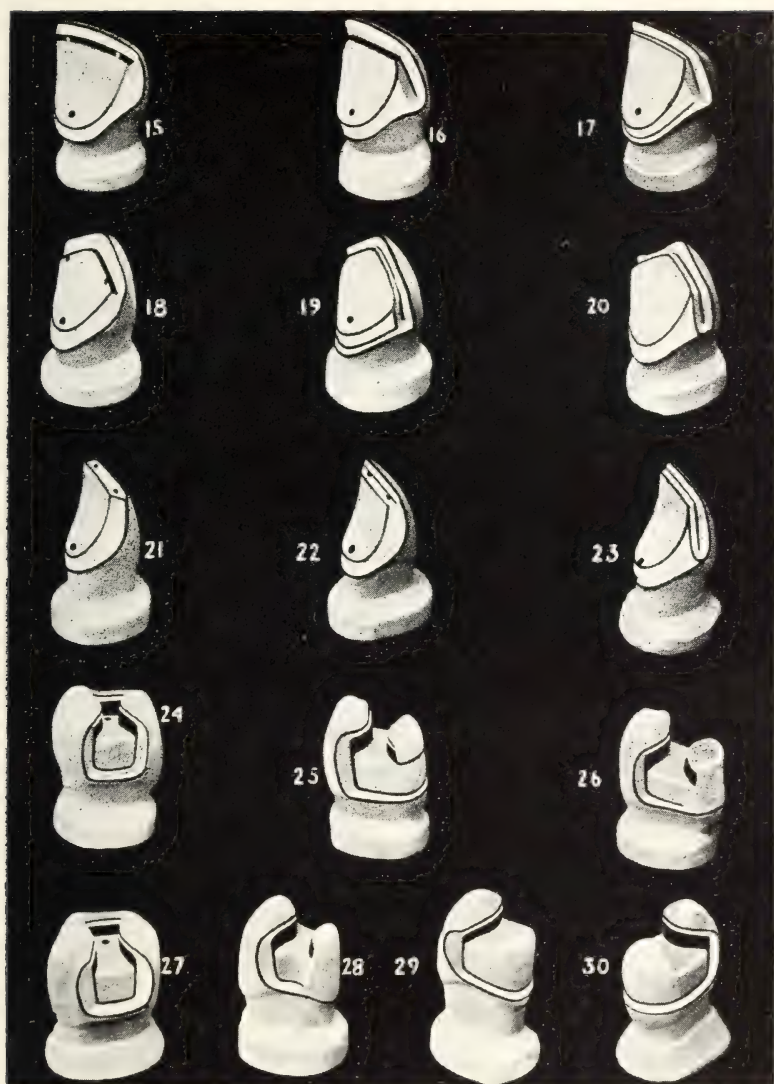


Cuts number one and two are a few examples of cavity preparation that might be used as abutments for bridges or special attachments.

The preparations for the lower molars are shown in Cut A, No. 1 to No. 8.

No. 1.—Mesial occlusal with intra-dental pin at distal placed parallel to axial wall and as deep into the tooth as possible without injury to the pulp.

No. 2.—Mesial occlusal with buccal groove with or without pin.



No. 3.—Mesial occlusal, buccal groove and mesial buccal band; the cusp is exposed in this preparation; indication for use very young patients.

No. 4.—Same as No. 3, only the mesial buccal cusp is involved or covered.

No. 5.—M.O.D. with a lingual band, the lingual cusps exposed.

No. 6.—The three-quarter crown.

No. 7.—The three-quarter crown applied to the mesial surface.

No. 8.—The three-quarter crown applied to the buccal surface.

The preparations for the upper molars are shown in Cut A, Nos. 9 to 14.

No. 9.—Same as No. 1.

No. 10.—Same as No. 2, except that the groove is prepared on the lingual surface of the upper molars, instead of the buccal as in the lower molars.

No. 11.—Same as No. 3, only lingual cusp is used.

No. 12.—Same as No. 4, only the lingual cusp is employed.

No. 13.—Same as No. 5.

No. 14.—Same as No. 6.

The upper anterior preparations are shown in Cut B, Nos. 15 to 20.

Nos. 15 and 18 are the slipper preparations, with three intra-dental pins inserted spanning the pulp.

Nos. 16 and 19 are half slipper and three-quarter types with mesial and distal grooves, incisal step and intra-dental pin at the singulum. Indicated on centrals, laterals or cuspids presenting with a very thin incisal edge.

Nos. 17 and 20 are the three-quarter preparations, Carmichael, or Tinker may be employed with or without intra-dental pins, according to the strain that they will be subjected to.

Nos. 21, 22 and 23 are lower incisor preparations, and are employed according to the age of the patient, the wear and shape of the teeth.

Nos. 24, 25 and 26 are the upper bicuspid preparations. No. 24 is the mesial occlusal inlay with intra-dental pin; No. 25 M.O.D. lingual band; No. 26 the three-quarter crown, buccal cusp not involved. This same preparation may be made employing or protecting the buccal cusp.

Nos. 27, 28, 29 and 30 are lower bicuspid preparations. No. 28 the lower first bicuspid; No. 29 the lower second bicuspid; No. 30 a three-quarter crown preparation prepared on the buccal surface of the lower bicuspids, often necessary to employ when abutment teeth are out of proper alignment.

There are only 18 combinations necessary to know for the proper and correct construction of a fixed bridge. All other restorations are a combination of two or more of these 18. For example, in all combinations of one tooth out, such as a central, a lateral or a cuspid, etc., we have 7 combinations; or all combinations of two teeth out, such as two centrals, a central and a lateral, etc., we have 7 combinations. We have also four exceptions, which are two bicuspids and a lateral out; three anteriors, as two centrals and a lateral, out; the four incisors out; and two bicuspids and first molar out; which make our total of 18 combinations.

The following chart will serve as a guide in selecting and determining what type of abutments should be employed for the different combinations of teeth out.

# APPLICATION OF ABUTMENT PREPARATIONS.

## *Class 1 Where One Tooth Is Missing.*

1. Central missing, anterior abutment 15, 16 or 17, posterior abutment 15, 16 or 17.

2. Lateral missing, anterior abutment rest on central, posterior abutment 18, 19 or 20.

3. Cuspid missing, anterior abutment rest in inlay, posterior abutment 25 or 26.

4. 1st bicuspid missing, anterior abutment rest in inlay, posterior abutment 25 or 26.

5. 2nd bicuspid missing, anterior abutment rest in No. 24, posterior abutment 10, 11 or 12.

Anterior abutment rest in No. 14, posterior abutment 10, 11 or 12.

Anterior abutment 25 or 26, posterior abutment rest in No. 9.

Anterior abutment No. 25 joined to posterior abutment No. 9.

6. 1st molar missing, anterior abutment No. 24 joined to posterior abutment No. 9.

Anterior abutment rest in No. 24, posterior abutments No. 10, 11, 12, 13, 14.

Anterior abutment No. 25 or 26 joined to posterior No. 10, 11, 12, 13, 14.

7. 2nd molar missing, anterior abutment rest in No. 9, posterior abutment No. 14 or crown.

## *Class 2 Where Two Teeth Are Missing.*

8. Two centrals missing upper, use three teeth as abutments, laterals No. 15, cuspid No. 18.

Two centrals missing lower, use two teeth as abutments, No. 21, 22 or 23.

9. Central and lateral missing, central No. 15, cuspid No. 18, or central No. 15, cuspid No. 20.

10. Lateral and cuspid missing, anterior abutment No. 15, 16 or 17, posterior abutment No. 25 or 26.

11. Cuspid and 1st bicuspid, anterior abutment No. 15, 16 or 17, posterior abutment No. 25 or 26. Omit the lingual cusp on 1st bicuspid pontic.

12. 1st and 2nd bicuspids missing, anterior abutment No. 18, 19 or 20, posterior abutment No. 10 to 14.

13. 2nd bicuspid and 1st molar missing, anterior abutment No. 25 or 26, posterior abutment No. 13 or 14 or crown.

14. 1st molar and 2nd molar missing, anterior abutment No. 25 or 26, posterior abutment No. 14 or crown. Reduce occlusal surface of pontics to half the area.

## *Class 3 Where Three and Four Teeth Are Missing.*

15. Lateral and two bicuspids out, cuspid abutment No. 20 and 1st molar abutment No. 13 or 14, rest on the central.

16. Two bicuspid and 1st molar out, anterior abutment No. 20, posterior abutment No. 14 or crown. Reduce the occlusal surface of pontics to half the area.

17. Two centrals and one lateral out, cuspid abutment No. 18 to 20, lateral abutment No. 15 to 17. Employ both cuspids and the lateral as abutments.

18. Four incisors missing, cuspid abutments Nos. 18, 19 or 20. This form of bridge is indicated only when the alveolar ridge is very prominent and the bite is very light or a lower denture below.

19. All other forms of restorations are a combination of the above and should be designed the same; for instance, right lateral and central out and left lateral out is a combination of one tooth out (lateral). No. 2 and two teeth out (central and lateral), No. 9, and should be constructed as individual bridges.

*(To be continued.)*

### Oral Hygiene Committee—Ontario Dental Association.

THE Oral Hygiene Committee of the Ontario Dental Association held its first meeting for the year on June 14th, when the following officers were elected:—

Chairman—Dr. F. J. Conboy. Vice-Chairman—Dr. H. E. Eaton. Secretary—Dr. Robt. Dunlop. Treasurer—Dr. A. W. Ellis.

An addition to the Committee was made as follows:—Doctors E. A. Grant, W. C. Trotter, W. Seccombe, and R. J. Reade, while it was decided that the Academy of Dentistry be requested to appoint another member.

The committee discussed the programme for the coming year, which promises to be an extensive one.

The Dominion Toilet Brush Co., of Morrisburg, Ontario, submitted a proposition whereby they would supply the Challies tooth brush at a very reasonable cost to the children of the Province who cannot afford to buy a brush in the ordinary way.

The Committee decided that the profession could not endorse any particular make of brush, but that any brush conforming to the description as set forth in the booklet, compiled by the Committee, will be considered satisfactory.

The Committee will be pleased to supply these booklets, "Information Useful for the Preparation of Public Dental Lectures," to all dentists who send a request for same to the Secretary.

In the same manner fifty copies of the booklet entitled "The Care of the Teeth," for distribution to the public, will be supplied to any one dentist requesting same. Copies over that amount may be obtained at the cost price of publication.

All communications should be sent to the permanent address of the Committee, 240 College St., Toronto.

## Dental Survey of Public Schools in Oshawa, Ontario

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THE first steps towards looking after the health of the pupils of the Oshawa Public Schools were taken in September, 1919, when Miss Seiling was engaged by the Board of Education as School Nurse.

Following this the Department of Dental Service was established in the Schools in January, 1920, with Dr. Phillips, as the dental officer, giving his services two half days per week. The demand for dental service gradually grew, and in April, 1921, Dr. Tucker was appointed as assistant to give two half days per week. It was impossible to keep pace with the growing demands, so in January, 1923, Dr. Langmaid was added to the number, and with the addition of Cedar Dale, a suburb, it was found necessary to appoint Miss Huck as second School Nurse.

There has been little or no destructive criticism from any quarter. The School Board, School Inspector, the School Nurses and teachers, in fact all who are in any way connected, have co-operated; but up to this date no dental survey had been made, and in the months of April and May of this year a thorough examination of all children was made. All defects were reported to the parents, advising them to take their children to their family dentist. Those who cannot pay, or those who for any reason will not do so, we are anxious to take care of in the schools, for we do not believe that any child should suffer either through inability to get services from their family dentist or through wanton neglect. After the examination a fifteen-minute talk was given in each class-room on the care of the teeth. Realizing that prevention is of most value, the dentist in his talks to the children stressed the importance of the care of the temporary teeth, the anatomy and care of the teeth, the approved method of brushing and relation of diet to the teeth.

Just here may we give the rules of diet in reference to teeth as given by the Department of Dental Research of the University of Toronto.

From six—sixteen years:

The child of school age may partake of the plain wholesome diet of the average family table with the following exception:

A—No coffee or tea.

B—No cured or smoked fish (highly indigestible).

C—No pork or other rich meat; no salad dressing (these foods destroy the appetite for plain food).

D—Pastry sparingly.

E—No candy or intense sweets between meals. They are appetite destroyers. Unquestionably candy is the enemy of perfect teeth.

Don't bolt food, eat slowly and chew thoroughly.

The school nurses will now follow up the examination and make all appointments for children who are to go to the School Dentists.

The following is a tabulation of results found by Dental Survey:

School	Children inspect.	Defect.	Defect.
		Perm Teeth	Temp. Teeth
King St. ....	335	97-28%	131-39%
Mary St. ....	321	60-18%	49-15%
H.S. Portbl. ....	36	9-25%	3- 8%
Hillcroft. ....	79	19-24%	21-26%
Albert. ....	340	135-39%	137-40%
Simcoe. ....	326	123-37%	122-38%
Centre. ....	368	97-26%	172-47%
Cedar Dale. ....	271	89-32%	136-50%

Regarding the preceding tabulation attention is directed to several points.

(1) The condition of the teeth in the senior grades is splendid and compares very favorably with the reports of any of the large cities.

(2) The temporary teeth are not receiving the attention they should and are the source of a great deal of infection.

(3) Of the teeth having Dental Caries, about 85% were the "Sixth Year Molars," these teeth are mistaken for temporary teeth and neglected.

(4) To insure results from this survey, it is hoped that everyone will co-operate, so that our boys and girls will have healthier bodies and brighter minds.

Signed.

W. J. LANGMAID.

S. J. PHILLIPS.

T. S. TUCKER.

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## British Columbia Dental Board

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THE following graduates of the Royal College of Dental Surgeons were successful in passing the recent examinations of the British Columbia Board of Dental examiners:—Ernest Fraser Allen, Frank Patrick Kenny, Gordon Augustine MacBeth, Eric Reginald Rowan, Charles Samuel Dawe, and Ray Holland Wilson.

# How About the Patient?\*

BY ROBERT R. GILLIS, D.D.S., HAMMOND, INDIANA.

ONE of the most successful factors in the conduct of a dental practice is the patient. Not one of us in the dental profession could long remain therein if not for the constant presence of this valuable adjunct to our work.

The same statement applies to the practice of medicine or of any other learned profession. And yet, how many of us have stopped to consider many angles of the question "How about the patient?"

When invited by your officers to become your essayist for this evening, several themes of a technical nature were suggested. Not one of the suggestions seemed to offer a line wherein we could presume to afford this society anything vitally new in technic. In your membership, you already number many men who could tell you more about those subjects than any outsider. And, furthermore, it seems to me that an occasional diversion is advisable, an occasional recess from consideration of technic or methods of accomplishing a given operative result.

Is it true that the multiplicity of methods today leaves all of us in a quandary when we seek the best method for handling a given case? Men can be found who advocate one certain method, and as many more are ready to condemn that method and offer a panacea through another technic. Which is right?

Without unqualified rejection of any of the novel methods offered in our increasingly voluminous literature, how may we be morally certain as to which advocate is right?

Your essayist realizes as well as anybody that progress is desirable and inevitable—evolution is bound to bring changes in our methods. When then can we as individual practitioners discard the old and adopt the new? What shall be our cue to prompt the adoption of the sage advice of Polonius to his son?

"Be not the first by whom the new is tried—  
Nor yet the last to lay the old aside."

We would suggest, in answer, that one other question be first asked and *answered*. Therein will be found a solution for the relative merits of old and new methods; this primary question is "How about the Patient?"

How about the patient? How about your patient? How about *my* patient? Make it personal in every case.

Just suppose that the relation of patient and operator were reversed for the time being, then how about the patient? Then you certainly

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\*Read before the Indianapolis Dental Society, November 13, 1922.

would have a very personal interest in a proper solution of the problems involved.

It is our firm belief that just such an interest should be manifested in every case that comes under our care. Is such an interest always exhibited? The answer is left to you as individuals.

There are dentists who appreciate their true position and value in the social economy. There are dentists who do not. Some conduct their practice as though it were a thing related in no way to the community welfare, as a thing isolated and unconnected with other human relations.

We believe that no dentist worthy of a professional degree and cognizant of the economic value of his properly-directed effort could become a parasite upon his community. Yet we do have dental parasites! It follows then that some dentists fail to measure up to one or both of the points essential to a real dentist, professional worthiness and professional conscience.

The dental colleges and the state examining boards have passed favorably upon the first essential, professional worthiness or ability, so it is not our present privilege to question or discuss that feature. As to the second essential, professional conscience, we could enter into a long discussion. We bring this question for your individual consideration, *ad libitum*.

There are some points to which we would call your attention while you are individually engaged on this problem. "How about the patient?" always should be first.

A new patient presents himself to you for professional service. This patient is sick, in a sense; subnormal, or he would not require your service. Now, how about the patient and what shall be your treatment?

Are you operating a mill through which your human grist passes day after day in which all are treated alike? If so, do you find the end result of your effort to be equally satisfactory in each case, or don't you ever take the trouble to check up your product? Take warning that if *you* do not check up frequently as to *your* product, you will sooner or later find that you are being checked up by others and perchance you may be checked *out* due to *your* oversight of this detail.

Every patient is a variation from the average run of practice. Each patient requires some special attention, special care and individual treatment. While under your care, there is a responsibility upon *you* which some practitioners accept too lightly. Every patient has a certain value in your community—some rate high and some lower.

The responsibilities resting upon the dental profession have been recognized by men outside our profession and should be recognized by *ALL* within the profession.

An eminent surgeon, some years back, laid serious charges of improper professional conduct (as judged by end results) against American dentistry.

More recently another eminent surgeon hurled a challenge at American dentistry, which might be interpreted as a veiled charge of past errors.

Something was wrong with us or two such students of human ills would not have arrived at similar conclusions. Their words served to tear a veil from our eyes and thus reveal conditions to which we had been blind.

Efforts by American dentists to eliminate the cause for the charges and meet the challenge have resulted in quite a revolution in methods of practice during the past fifteen years. Leaders in our profession have labored diligently for the betterment of the profession—and yet the leaven is not working in the mass as rapidly as it might. What thus retards this leavening process?

Is it possible that dentists are so busily engaged in conceiving and perfecting new methods of procedure that they lose sight of the human element and the undeniable rights of their patients?

Is it possible that we are so busily engaged in our problems of technic that we fail to appreciate some of the problems of the patient?

Let me assure you that the patient has some problems. If any of you have needed service in any professional line recently, you have probably appreciated what a problem the layman faces in choosing an acceptable professional servant, in whom he can place his confidence. To whom can he apply for service best adapted to his case? Where can he turn that he will not be made the subject of an experiment? Where can he find a doctor who will ask himself "How about the patient?" How can he be assured that he will not approach a doctor who is thinking of everything else except the patient?

You can realize without much study that we have dentists so bent upon being "up to the minute" in practice that they do not give proper thought to the patient's needs. Some there are in our profession who overlook the fact that our supply of patients is practically unlimited and they rush through one case and then another with the apparently sole ambition of filling their personal exchequer before the supply of patients is exhausted.

Since dentistry is now considered as ranking with medicine in the healing arts, so may we consider that the supply of patients seeking service is the mutual field of supply for both professions. But before dentistry can deserve to draw upon that mutual field of supply, we dentists must have developed a full appreciation of our responsibility as we stand on a par with the man of medicine and a full realization of the value of every human being in our community life.

Human life cannot be accurately evaluated; but by comparisons

and by a study of certain facts we may come to a better comprehension on this point. From the number of patients whom you see in a month or year who are incapacitated through dental disease or systemic disease of dental origin, you realize that in your small field of observation the total economic loss is no small item.

It has been estimated that the total economic loss from disease in the United States amounts to \$7,500,000,000 annually. When we consider that before the war it cost about \$1,000,000,000 per year to meet all the operating expenses of the national government, we appreciate that disease losses mount to a staggering total.

500,000 people die from communicable diseases every year.

5,000,000 are incapacitated at all times.

Do you realize that there are

500,000 suffering from tuberculosis at all times,

132,000 suffering from pneumonia,

150,000 from scarlet fever, measles, whooping cough, diphtheria, etc.,

300,000 from kidney diseases and heart diseases,

80,000 from cancer,

1,500,000 from syphilis and 2,000,000 from gonorrhea?

The mere reading of these figures means next to nothing to us, for it is such an impersonal matter. Only to whatever extent those items reach into our immediate affairs do we exhibit a personal interest.

A few weeks ago, forty-seven miners were entombed in a California gold mine. We read the newspaper headlines and some of the detailed account, but that catastrophe was outside the circle of our personal interest. We are accustomed to pay scant attention to matters that do not reach us in personal contact. Nevertheless, here is a condition prevalent all about us every day which deserves the personal attention of every person in this audience and all our possible effort to alleviate and prevent its continuance.

Two million of our fellow citizens are suffering today from preventable diseases; 500,000 of them are well-advanced victims of tuberculosis. Statistics reveal in the post mortem examinations held the country over that 90 per cent. of the subjects show a trace (or more) of pulmonary tuberculosis!

Do you know that 40 per cent. of all poverty is caused by disease—mostly preventable disease?

Do you know that only 40 per cent. of our people are gainfully employed, and that the effort of the 40 per cent. maintains the other 60 per cent. and themselves? That is largely the penalty of disease, the direct burden.

The indirect burden of disease, the sorrow, the grief, the worry, is beyond computation.

In the draft examinations of the recent war, 468 boys out of every

thousand were rejected because of physical impairment—again the result of disease.

Over 46 per cent. incapacitated to serve their country efficiently, and yet these physically subnormals can propagate; and their reproduction constitutes another heavy burden on our social economy.

It has been estimated that the yearly loss from sickness per man in the United States amounts to between seven and nine days, computed on the total male population. The condition is appalling and would fill us with even greater apprehension if we did not see a ray of hope in the fact that the extent of the economic loss is beginning to be recognized and some remedy is being sought.

To any dentist who feels that he is laboring in a rather limited field, we would invite a closer study of the picture drawn from these statistics. Figures are dry things usually and the full importance of the conditions here disclosed cannot be grasped by casual reading.

How many cases among the 300,000 kidney and heart lesions may have had their inception in faulty dental operations?

How many of the other million sufferers may have had predisposing or contributing conditions in their mouth?

Any modern dentist should be able to recognize abnormal conditions and know how to remedy them.

How many dentists actually look at their patients or into their mouths and see anything more than just teeth?

If we are to establish dentistry on a parity with medicine, we must be able to understand our patient from more viewpoints than just teeth alone.

If we are to command the respect and hearty co-operation of men of medicine and surgery, dentistry must encompass a wider scope of usefulness than has been generally accorded (or often deserved) in the past.

We are sometimes humiliated when a physician *orders* that certain teeth be extracted. This embarrassing situation will cease when dentists prove themselves capable of understanding human ills in a broader sense.

There is no other branch of medicine where orders are thus given, and medicine will not presume to command a certain dental service when the individual dentist has demonstrated that he understands ailments beyond the teeth themselves and the systemic results of dental etiology.

In the routine practice of any specialty, the practitioner is liable to become somewhat blinded to the individual patient's needs. His practice may become somewhat a matter of habit—a set of motions or methods rather mechanically pursued.

The advice of an old practitioner of medicine to his students would

apply to such specialists, when he said, "Don't forget to look at your patient once in a while!"

Specializing also tends to make some practitioners rather narrow. Each field of endeavor exhibits a few followers who make exorbitant claims for the good their service or methods can accomplish. That is wrong. The man in general practice has an advantage of broader perspective over any specialist. The judgment of a successful general practitioner is safer than that of the average specialist. Any man will do best the things he likes to do. I believe most general practitioners established through many successful years, remain general practitioners because such work appeals to them. I fear that many so-called specialists are in their chosen field because of another urge—easy money. How about the patient who falls into their hands?

How about the patient whose case indicates extensive tooth extraction? Would you like to be the patient and fall into the hands of a fellow who practises "extensive surgical removals"? That sounds mystifying—also costs more money!

There is unquestionably a field for the legitimate conservative removal of the infected parts; but Heaven help the patient after some alveolectomies!

How about the patient who presents with a number of pulpless teeth? We deem that he is fortunate indeed if he does not fall into the hands of a 100 per cent. vitality faddist. Nature did not give man teeth without a purpose and we consider that we serve our patients best when we conserve their natural teeth. Our policy is to get rid of infection but save the teeth whenever possible.

On the other hand, I have heard of folks who ignore all forms of infection! We have them in Indiana; many of them in Logansport, but they are locked up, and any still running at large ought to be locked up there, too.

How about the poor patient? The poor we have with us always. How shall they be treated?

They are entitled to equal care in the relief of pain as is accorded to all other patients. Once in a while there is a poor patient who is appreciative to whom we may well render service gratis. But most adult persons for whom service must of necessity be gratis are of a type with little appreciation; long continued charities have pauperized them and for such the writer has scant sympathy.

How about the rich patient? "This fellow can afford to pay, stick him" seems to be the motto of some dentists. Unquestionably that policy is wrong.

Let such pay well for what they get but in no case do we find any excuse for a fee beyond the measure of service rendered.

And how about the child patient? Here comes a little fellow (rich

and poor alike) with the mouth neglected by the parents until pain demands relief. This little patient is one of our biggest problems.

Some dentists say: "Let's have a dental clinic for the kids and send them all there," as if that disposed of the question. What to do when the child arrives at the clinic? It is a safe bet that the dentist who thus disposes of his young patients will not be found on the staff of such a clinic. No, he does not like to work for children and he makes his dislike evident. Such a dentist is not a whole man; he is not completely rounded out; some of his early training has been sadly neglected, to say the least.

Dental clinics for the children are being established in many cities. They aim to do a good work. But their scope is too narrow. We do *NOT* need a children's dental clinic, but we do need children's clinics that contemplate the whole child.

Therein lies dentistry's greatest opportunity today, to so treat and conserve the teeth of children that these patients will become living examples of the benefits accruing from a clean mouth.

Here is our opportunity to demonstrate that dentistry is not teeth alone, but that dentistry functions to safeguard and protect the whole body.

The value of our professional service can best be measured in terms of usefulness to the patient—not by beauty or perfection of technic. Since the child has a longer period of expectancy during which to benefit from and use our service, its value to him is proportionately increased.

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If the questions suggested in this presentation can but arouse a greater appreciation of the relation of the dentist to his community; if contemplation of these suggestions can create realization of our true professional responsibilities, if we but pause more often to ask ourselves "What about the patient?", then our effort is rewarded.

How do you answer this query—Does the public exist for the good of the profession or does the profession exist for the good of the public?

A real dentist must have vision that he can appreciate in the broadest sense the many contact points between his profession and the public *and practise accordingly*.

It is our belief that no man can be a *good* dentist who is *only* a dentist.—*The Dental Summary*.

## Holiday Don'ts

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**D**ON'T neglect to take a supply of mosquito netting with you so that if these pests are bad you can wrap it loosely around your head, either in camp or in your room, and thus get to sleep, setting these insects at defiance. It is true the hum of the mosquito is not at all musical and certainly gets on your nerves, but not if you know that it cannot get at you.

People who are very susceptible to the poison of the mosquito, oftentimes have the pleasure of their holiday marred in this way. The mosquito, like the housefly, can best be prevented by destroying its breeding place. The mosquito breeds in stagnant water. Do not allow any vessel to stand for any length of time containing water in which a mosquito might deposit its eggs. If you find stagnant water near where you are boarding, suggest to the proprietor that he put a little coal oil on the surface of the water. A small quantity will spread over quite a large body of water, but this must be repeated after every rain.

Notwithstanding all the precautions you may have taken, you may get bitten by a mosquito. If so, the prompt application of a drop of liquid ammonia will very often counteract the irritating effects, but do not under any circumstances scratch the part bitten, as this only aggravates it, and you may in addition to this, infect the wound. If the itching is intense, just simply press the part with a handkerchief. It will give quite as much relief as the scratching and will not produce irritation and subsequent trouble.

Mosquitoes may be kept away by the free use of equal parts of oil of citronella and sweet oil or oil of sweet almonds. Rub carefully every exposed part, such as the face and hands, but be careful not to get it in the eyes, and be careful in using it with children if you put it on their hands, as they are very likely to rub their eyes and set up considerable discomfort and irritation. In fact, almost any preparation with a pungent odor will aid in keeping the mosquitos at bay. For instance, camphor dissolved in a little alcohol, or what is commonly known as spirits of camphor, answers remarkably well.

DON'T remain in a hotel or boarding house where there are flies in the dining room or kitchen. Flies are not unusual carriers of disease germs and frequently pass from filth to food. There is nothing too filthy nor yet is there anything too dainty for the housefly to revel in, and it not infrequently travels directly from one to the other. There is no excuse for having flies in the dining room or kitchen where food is handled or being served for human consumption.

DON'T be over-zealous in your efforts to get sunburned. Take it gradually; an hour at a time is quite as long as any portion of the body unaccustomed to exposure should be exposed to the strong rays

of the sun. In a few days, with care, you will find that you can more or less disregard the effects of the sun's rays on your skin, as you will then have developed a satisfactory protection, but once you have the skin blistered you will suffer extreme discomfort and at times sleepless hours.

DON'T keep on the go all the time during your holidays. Take some reading matter with you and spend part of the time, particularly in the middle of the day, in the shade of the trees, in your hammock, or in an easy chair, or lying on a rug on the ground.

DON'T dance every night during your holidays and expect to come back rested and refreshed for your next week's work.

—*Health Bulletin, Department of Public Health, Toronto.*

## Federation Dentaire Internationale

THE next session of the F.D.I. will be held this year in Paris on 6th, 7th, 8th and 9th August, 1923, Paris University (Sorbonne), rue de la Sorbonne.

On account of the resolutions which were passed last year at Madrid, this session may look forward to a considerable amount of work following on the interruption of seven years (1914-21) in the activities of this organization. It will be necessary to ratify the measures taken by our special delegate for the organization of the Russian Relief Fund of the F.D.I.

Reports will be presented by all Commissions, some of which are of recent formation; thus the following questions in particular will be treated:

1. The practice of dentistry in different countries;
2. Ideal curriculum of dental studies (preparatory, biological and professional);
3. The present state of technical instruction;
4. International centre for scientific dental research;
5. Code of Ethics;
6. Care of the teeth obligatory or optional by the State, Municipalities, Schools, Factories, etc.;
7. Dental service in the Army and Navy of various countries.
8. Terminology and Nomenclature;
9. Publications;
10. The F.D.I. and the Red Cross, etc., etc.

Owing to the number of these questions, the session will last four days.

We, therefore, beg you to come in order that you may take part in these deliberations.

Hoping you will be able to be present among us,

Yours sincerely,

*The President*  
TRUMAN BROPHY

*The General Secretary*  
FLORESTAN AGUILAR

*The Assistant Secretary*  
G. VILLAIN

# The Status of the Dental Profession\*

By PERCY A. ASH, D.D.S., F.A.C.D.,  
*Lecturer and Examiner, University of Sydney.*

THE subject I have selected for this evening is a well-worn one, and no doubt some of you are tired of hearing it discussed. I have chosen it at this stage for two chief reasons: (1) because there are present at this Conference many dentists from the country who are not familiar with all that is going on in the city regarding dental politics; (2) because, at this moment, efforts are being made to bring about such amendments to the existing Dental Act as will, if passed, raise the status of the profession very considerably. You dentists from the country are asked to give your moral support to the efforts of the city practitioners and, if needs be, when the Bill comes before Parliament, to interview your respective Members of the Legislature and enlist their support in the right direction.

Some of you will remember that before the year 1900 there was no Dental Act in force in this State at all, and hence anybody, from the highest public official to the humblest laborer, could practise dentistry without risk of interference by the law, unless, of course, he was found guilty of malpractice or doing a patient actual harm. The profession in those days was at a low standard as compared with law, medicine, divinity and others, but there were men in it who saw that if ever dentistry was to be recognized as a calling attractive to young men of brains and good standing, an effort must be made to pass legislation which would place it beyond reproach in the eyes of the public. Only those who undertook the work of reform can tell of the great difficulties encountered at almost every turn, and, as a consequence, the Act of 1900, though incomplete in many ways, was the best that could be obtained in the face of the great opposition. As years passed on, and the general public began to realize more fully that dentistry was something more than a tinker's art, they gradually exercised greater caution in the selection of a person to whom they would entrust the care of their teeth, and so politicians too became impressed with the fact that the bodily welfare of the people was largely in the hands of the dentist and greater protection must be afforded, and so Amendment Acts have been passed from time to time, until today we have an Act which is one of the best, taken as a whole, that can be found in any part of the world, though it has some defects, particularly in that it allows indiscriminate advertising, about which I shall speak again later.

You will agree with me, I think, that if we are aiming at a Dental

\*Read before the Third Annual Conference of the Society of Dental Sciences.

Act which will place dentistry on a pedestal, then we should also be sure that the young men and women who are admitted to practice are well educated, and otherwise of such good personality and standing that they will reflect credit upon it. Those members of the profession who have been in active practice for a long time, and have carefully watched the progress of events, scarcely need to be reminded of the great changes which have taken place. The profession of dentistry is no longer a refuge for the brainless and the destitute, but the goal of ambition for many young men who realize that its diplomas and distinctions can now be obtained only as a reward of merit, and not in exchange for gold. Certainly, the Act at present in force in New South Wales has permitted many young men to enter the profession by somewhat of a side door, in that they have been allowed to sit for modified examinations before the Dental Board, and, if successful, given a licence to practise. The Board has been taxed with this procedure on more than one occasion, but it must be remembered that the Board, after all, can only administer the Act as it finds it, and cannot over-ride it by preventing students from taking every advantage open to them. The profession has been given to understand that these modified examinations have been, largely, part of the aftermath of the war; that is to say, young men who went away to fight for their country after entering upon the study of dentistry were granted special facilities on their return in order, no doubt, to compensate them in some way for the valuable time they had given to military service in the hour of need. It has been stated that these modified examinations have now practically come to an end, and it is to be hoped that such is the case.

Dentistry has now reached a stage when a course of study on a high standard, extending over four years, seems an absolute necessity. In addition to his four-year curriculum, it is now compulsory in New South Wales that before any student can begin on his professional studies he shall have passed an examination in general education equal in standard to the matriculation examination for medicine, science or engineering in the University of Sydney. A great deal of exception has been taken to this preliminary examination, especially by men of more mature years who have suddenly decided to go in for dentistry and found themselves held up in consequence of not having passed any University examination equal to the standard of the matriculation in their younger days. I have stated above that if we want to hold the profession of dentistry up as one which will compare favorably with others of longer standing, we must take care that it is composed of well educated men and women. The fact that a prospective student cannot comply with the conditions laid down is no reason why he should classify them as harsh and unnecessary. The public will judge dentistry on just such a level as the dentists themselves allow it to

remain, and therefore every effort should be made to see that the standards are kept up.

We are pleased at all times to classify dentistry as an important branch of science. Let us, then, play the part of scientists. A scientist needs to be well educated, and should especially know the history of the steps by which the present stage of knowledge of his particular sphere has been reached, as well as the origin of the terms and descriptions which he requires to employ. In other words, a certain degree of proficiency in general education is an indispensable part of the training for any profession. The type of professional man who cannot express himself in correct English, and who does not know the origin of the terms which his every-day duties require him to use, is gradually disappearing. The stage has now been reached in almost every profession of adopting a standard of general education which everyone must attain before being permitted to enter on the course of practical and scientific training. This is as it should be, and it is obviously to the interest of the dental profession that those entering it should be educated and trained to such a degree that they will be able to maintain the reputation and status of their class in the community.

Though, as I have indicated previously, there are still many things that dental legislation could do for us, it has done one thing which has been of inestimable benefit, viz., it has made the registration of dentists compulsory, and has specified the course of study and other requirements to be complied with before any person can be registered. Nothing in the history of the profession in this State so raised its status as that one enactment, and, in this relation, it is pleasing to be able to note that New South Wales secured that very necessary legislation years before it was passed in England, the head of the British Empire, to which the offshoots usually look for ideals and guidance. It is only within the last ten years that the following amazing paragraph appeared in the public press:—"There are 20,000 quack dentists in Great Britain. There are only 5,140 registered dentists, and they have to suffer from the competition of the quacks, who are mostly dental mechanics, with little or no training, no diplomas, and no degrees. They are within the law if they call themselves 'Dental Specialists' or put up above their places of business the sign 'Dental Surgery,' or 'Dental Parlor,' or 'Dental Institute.' Animals, owing to the Veterinary Surgeons Act, have more protection against quacks operating on them than have human beings from quack dentists." It is only within the last two years that the law has been so amended in England as to make this sort of thing impossible.

I should like to point out, in passing, that compulsory registration has also rendered a good service in that it has prevented the term "quack" being applied to any dentist in the State of New South Wales at least. A "quack" is a person who pretends to knowledge or skill which he does not possess—an impostor, an incompetent boaster. The

law would not hold a registered dentist to be any one of these, for the chief reason that registration is intended to carry with it "sufficient guarantee of the possession of the requisite knowledge and skill for the efficient practice of dentistry." Henceforth, therefore, there will be no quacks among the registered dentists. Some dentists may know much more than others and possess greater practical skill, and hence may build up larger practices; some may adopt a higher code of ethics than others, or allow themselves a little more latitude in various directions, according to their capacity to think on right lines, and their general aspect of what a profession should be, but the worst that can be said of these is that they are unethical, or incompetent as compared with more clever men; they are not "quacks."

At this stage I should like to introduce the point as to whether dentistry is an attractive occupation and, if so, why so many who engage in it fail. Is the fault in the profession or in the individual? There can be no doubt that a very large proportion of men are more adapted for the limits within which a profession is necessarily confined than for many phases of commercial life, which, if success is to be attained, demand a proper grasp of great questions of social and political importance. If a profession is decided upon for a youth, that of dentistry can now, with all justification, be placed among the more important ones worthy of consideration. It has, during the last quarter of a century, risen from a humble level to that of a science, but among the long list of professions it is questionable if there is one other which calls for so many special qualifications. Dentistry demands a combination of sound theory and manipulative dexterity, an attractive personality, almost unlimited patience, and a sympathetic and confident manner; many practitioners have failed because they have not realized this. A man may be a highly successful lawyer if he understands the law and can explain it to other people, or he may become famous in engineering if he can formulate great plans and then secure the necessary skilled labor to carry them into effect, but a dentist must not only understand his work and be capable of explaining it, but must, at the same time, be able to perform the most delicate operations with his own hands.

Dentistry as a vocation is fairly well crowded so far as numbers go, but there is plenty of room for those with ability and ambition. To be sure, many with ability have tried it and failed, but the profession must not be blamed on that account. The possession of the requisite knowledge and skill will not result in success unless accompanied by some, at least, of the personal qualities enumerated above. As a remunerative occupation, dentistry will compare favorably with medicine, surveying, accountancy and many others, and it is preferable to some in that the hours of work can be well defined if the operator will only adopt the right methods with his patients.

Further evidence of the standing of dentistry as a profession today is the fact that the medical profession has been forced to recognize it as a very important branch of medicine, without which the origin of many constitutional disorders could not be traced. It is within my recollection when some medical practitioners disdained to seek the services of dentists in helping them to diagnose the cause of certain systemic ailments from which their patients were suffering and they were not able to cure. Strangely enough, as the years have passed on, matters have gone to the opposite extreme, and many valuable teeth have, on the advice of medical men, been ruthlessly extracted in a vain attempt to trace the origin of some disease. Apart from this particular aspect of the case, however, the fact remains that the profession of dentistry has made such rapid strides and so forced itself into prominence as a valuable factor in the general health and happiness of the people that dental and medical practitioners may now be found working hand in hand in their efforts to combat the bodily ills from which humanity suffers.

In addition to recognition by the medical profession, it is now perfectly apparent that in all civilized countries dentistry is securing an increasingly important position as a branch of the healing art, for not only has it become a well-established specialty, but is itself becoming divided into branches, each of which is practised by experts. In the larger cities of the world dental surgeons specialize in orthodontia, extracting and so forth, and it is not uncommon to find two practitioners entering into partnership for the express purpose of taking up different branches of the work.

It follows, from all I have written above, that one of the essential features in keeping up the status of dentistry is the proper education of the dentist himself. There has been much controversy quite recently in some of the leading dental journals upon the vexed question of what comprises a sufficient education for the student in dentistry. As might be supposed, the discussion has been one, largely, of theory *versus* practice. That aspect of the subject can be viewed from so many different points that it is practically impossible to arrive at any definite conclusions. I have reminded you in previous articles that there was a time when dentists were regarded as little more than artisans, and dentistry itself as but a branch of trade which required no special ability. Today the position is quite different. Dentists are not mere mechanics or artists, but dental surgeons and graduates in dental medicine, and their course of study must, of necessity, be of a high and somewhat strenuous order and include an adequate knowledge of cause and effect. The governing bodies of the most modern dental schools fully realize this, and they are the ones, apparently, who are unwilling to delete from the curriculum any of the theory at present compulsory.

A feature which ought to be mentioned in a paper of this kind, because it largely affects the question of status, is that of money. If you ask the average man to name one of the main factors which furnish evidence of success in life, he will most likely say "Money." We must all admit, of course, that one can make little headway without it, and very few people are prepared to part with any portion of their belongings without receiving some of it or its equivalent in return. That is the commercial aspect of the case, and one is reluctantly compelled to admit that it is in keeping with the spirit of the material age in which we live. On the other hand, however, it must be borne in mind that there is a vast difference between trades and professions, and, in the latter again, there is also a great difference between those which embrace the healing art and those which, like law and accountancy for instance, are necessarily largely wrapped up in commercial affairs. A conscientious person who takes up the practice of healing the sick and suffering in any one of its branches must, of necessity, be prepared to allow the monetary aspect to take a somewhat secondary position. The very nature of his calling demands it, and if he disregards that demand and renders only such service as will prove financially remunerative, he is admitting at once that his vocation is on the same basis as any branch of trade in which barter and sale are among the recognized leading characteristics.

This question of money brings me to the last point upon which I shall touch, though there are many others which might be discussed, but my allotted time has expired. I refer to the question of advertising, especially in the public press. I intend to do little more than mention the subject here, as I have written, recently, an article or two in "The Dental Science Journal," dealing fully with it. In my view no one feature has done more to belittle the profession of dentistry than this system of advertising, and I would gladly welcome its entire abolition. Let us hope that if the proposed amended act materializes, a clause will be included which will bring about that much-desired end. The change might affect the pockets of a few, but it would be greatly to the advantage of the dentists as a whole, as well as in the interests of the public.

### Baby Wants a Drink

Poor wee baby cannot say,  
"Give me water right away."  
And it's little mouth gets dry,  
Soon it starts to fuss and cry.

So the baby makes this plea:  
If you really do love me,  
Won't you sometimes stop and think  
Your poor baby needs a drink.

# JUVENILE JINGLES

*Contributed to ORAL HEALTH by Dora L. Cameron,  
Wenatchee, Wash.*

## A Dangerous Thing

A comfort is a dangerous thing  
Some foolish Mothers buy,  
And put in the poor baby's mouth  
When it begins to cry.  
The baby settles down at once,  
And soon is fast asleep;  
You'll find the comfort in it's mouth,  
If you should take a peep.

Alas! Dear Mothers, don't you know  
A mouth is not the place  
For rubber comforts? It's a sin  
To spoil the pretty face,  
Cause adenoids and dreadful things,  
And very sad you'll be  
To find the pretty little mouth  
Look like the letter V.

So, Mothers, please take my advice,—  
Throw comforts all away,  
And baby will be glad you did  
When it grows up some day.

---

## Your Mixing Bowl

Suppose the mixing bowl was left  
Unwashed, from day to day,—  
With particles of food on it  
The bowl was put away!

You wouldn't want to eat the food  
Mixed in that bowl, I'm sure;  
Not only would the taste be spoiled,—  
The food would be impure.

Your mouth's a little mixing bowl;  
Your food you there prepare,  
Mixed with saliva, and your teeth  
Should grind each bite with care.

Your mouth and teeth you must keep clean,  
Or else, I greatly fear,  
Not only will your teeth be spoiled—  
You'll ruin your health, my dear.



## Two Barbers

I MUST confess to a very great aversion to having my hair cut. I think I dread it almost as much as the average individual does to have dental operations performed. It is not the operation that appals me so much as it is the operator—not the hair-cut so much as the barber. He usually displays such an immense sense of superiority that I feel like a pigmy in his hands, like a mere worm of the dust. This is especially true of a new barber. After I have one broken in so that he will let me live and breathe without listening to a tirade against the established order of things in the universe, it is not so bad.

I have found one barber who is human, and he and I get along very congenially and comfortably. His mentality is not very great, but I do not complain of that—I only trust that other people will be charitable of my lack of mental vision. He is not a young man, but he gives no sign of decrepitude. He is at the shop early in the morning, before the proprietor is there. I asked him one day what time he was supposed to open the shop. He said: "Oh—about 7 o'clock." It was then not yet seven, and I saw that here was a man who did not keep his eye on the clock every moment. I liked him.

He went away on a vacation, and a younger man took his place. I entered the shop one day and said "Good morning" to him. He never deigned to look up from something he was doing, and I felt properly suppressed. But I finally ventured to ask if I might have my hair cut. He mumbled something and looked up at the clock. I instantly realized the heinous crime I had committed. It was not quite 7 o'clock—it lacked between three and four minutes of it. I said meekly, "I am afraid I am too early." He very nearly sneered as he pointed me to the chair. I sat in the chair while he fumbled around and killed time till that magic 7 o'clock arrived—to be exact, till one minute past seven, probably with the idea of chastening me and showing me that he was boss of the situation, which he certainly was for that one time. He was so disagreeable that I became interested in him and wanted to draw him out. The weather is always a resource when you do not know what else to talk about, so I said: "It must have been rather warm in the shop yesterday." "Warm!!" he exclaimed, "I'll bet it was 150. You never saw such a hot hole

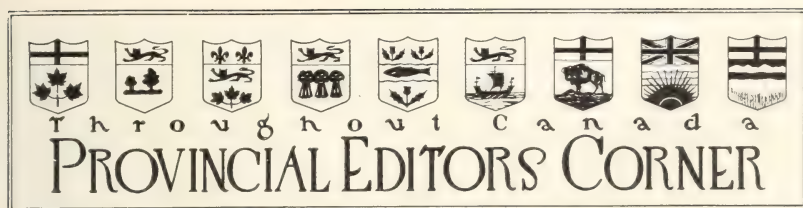
as this is. The boss is so afraid to spend a little money that he won't cut a hole in the back wall so we could get some ventilation." With that kind of a man the boss is always a tyrant. It made no difference to him that the plan he mentioned was wholly impractical owing to the fact that the wall was built against an embankment, and it made no difference that the boss had plentifully provided revolving fans and done everything in his power to make the place comfortable for his employees and patrons.

This man had been born with a grouch, or had cultivated one—probably both. Nothing was right in his estimation excepting himself, and of himself he had the most exalted opinion. And yet it seems that men of that type must be employed to-day because there are not enough of the decent kind to go around. The idea of service for the sake of service would have been a joke to this man—he would have laughed the idea to scorn. He was out of joint with the world, and the pity is that he was ever brought into it. There is only one extenuating circumstance that I can see. Possibly the man is in a certain sense a victim—a victim of a system dating back to the dark ages, when oppression of the weak was common practice. Possibly there was bred in the bone and sinew of this man's ancestors—he came from across the water—such a spirit of rebellion through oppression that it will take many generations to winnow it out. We must be charitable, but the thing I complain of is that this type of individual will come to this continent and vent its spleen in an intolerable arrogance that has no place in our society or our system of government. And yet we must be charitable. It was the late Elbert Hubbard who said: "To know all is to forgive all," and I have often been impressed with this fact.

But of the two barbers, which will succeed and which will not? It seems needless to ask this question, and yet it is natural that it should be asked. Since the war—more than ever before in our memory—there has been an apparent lack of respect for the other man's point of view which exhibits itself in the kind of intolerance illustrated in this young barber. We see it everywhere, and it is disheartening; but we must console ourselves with the reflection that it is not in accordance with the great comprehensive plan for the betterment of the world which must inevitably obtain in the ultimate, even though at times some demoralizing influence like the war gives it a temporary set-back.

It has often been said that the greatest thing in the world is love, and this is fundamentally true. Without it our civilization will never advance—with it, nothing can prevent its advancement. The one barber has love in his heart, the other has not. And it is the difference between sunshine and darkness.

*C. H. Johnson*



*BRITISH COLUMBIA*—A. T. OBERG, D.D.S.,  
833 Granville St., Vancouver

*ALBERTA*—JOHN W. CLAY, D.D.S.  
914 Herald Bldg., Calgary

*SASKATCHEWAN*—C. W. PARKER, D.D.S.  
Imperial Bank Bldg., Regina

*MARITIME PROVINCES*—STANLEY BAGNALL, D.D.S., Halifax, N.S.

*MANITOBA*—W. W. WRIGHT, D.D.S.  
767 Warsaw Ave., Winnipeg

*ONTARIO*—Lieut-Col. W. G. THOMPSON  
28 King St. West, Hamilton

*QUEBEC*—ALBERT DELORME, D.D.S.  
713 St. Catherine St., East, Montreal

## MARITIME PROVINCES.

AT the regular meeting of the Halifax Dental Society, on the 5th of June, the subject for discussion was "Business Methods in Dentistry." Dr. G. A. Chudleigh opened the discussion with a very comprehensive paper on the various business systems in use.

\* \* \* \* \*

There have been plans for many years to hold a Union Meeting of the various Dental Associations of the Maritime Provinces, and this summer it seemed as if we were at last to have a Union Meeting, but various difficulties arose and the meeting had to be called off. The Nova Scotia Society are holding their annual meeting in Halifax on the 24th, 25th and 26th of July. The meeting promises to be of more than usual interest this year. There are a number of important business matters in connection with legislation to come before the meeting.

The chief clinician will be Dr. Ante, of the staff of the Royal College, Toronto. And there will be a number of other clinics by local men.

\* \* \* \* \*

The Red Cross Travelling Medical and Dental Clinic has reached the status of an annual summer clinic in Nova Scotia. This year the clinic has commenced work in Halifax County. The clinic left Halifax on June 18th and opened in Upper Sackville on the same day. Thirty-five dental patients were treated on the first two days of the clinic.

Dr. S. C. Elliot (R.C.D.S.) is in charge of the Dental branch of the clinic. He is assisted by Dr. K. P. Johnson (Dal '23).

\* \* \* \* \*

Dr. J. Stanley Bagnall has been appointed Visiting Dentist on the staff of the Victoria General Hospital, Halifax. This is the first time a dentist has been appointed to the staff of this hospital. There is not only very great need for the services of a dentist on the staff of the hospital, as of all hospitals; but it is also felt that this

marks another step in emphasizing the frequent necessity of the treatment of dental conditions in association with systemic conditions. And as a large number of the practising physicians of the Maritime Provinces receive their practical medical training in this institution, the necessity of considering the influence of the oral cavity on systemic conditions will be brought home to them more forcibly.

\* \* \* \*

#### RECENT GRADUATES FROM DALHOUSIE. CLASS OF 1923.

F. M. Blanchard is planning to practice in Boston.

V. C. Calkin is opening an office in Pugwash.

M. A. Clay is running Dr. Dexter's practice in Digby.

H. S. Crosby and C. B. Climo are opening an office in Halifax.

C. J. Dooley has opened an office at Whitney Pier, Sydney, C.B.

S. D. Florian has opened an office at Whitney Pier, Sydney, C.B.

H. H. Heal has left for Oliver, B.C.

M. F. Hogan is travelling through Newfoundland with a portable outfit.

K. P. Johnson is on the Red Cross Medical and Dental Clinic.

N. S. McDonald is practising in Newfoundland.

S. G. McIsaac has opened an office in Glace Bay, C.B.

A. J. McLellan is practising in Windsor.

M. E. Morrison has opened an office in Canso.

L. B. Roop has opened an office in Bear River.

Hazel A. Thompson has opened an office in New Germany.

J. S. B.

#### Ontario Dental Association---1924 Meeting

THE Board of Governors of the Ontario Dental Association had a meeting on June 11th, and organized for next year's Convention, which will be held at the King Edward Hotel, from May 19th to May 22nd, 1924.

Tentative plans were made in regard to the programme, but the Committee will be pleased to receive any suggestions from any member of the profession, who would like to have some subject presented at the Convention.

A special Committee was appointed to prepare and present a report showing the position which the profession takes in regard to the various departments of work in connection with the practice of dentistry. Pulp devitalization, root canal fillings, fixed bridges and all other questions upon which there seems to be such a difference of opinion will be taken up, and an effort will be made to prepare a satisfactory pronouncement which may be given to the general public.

Every dentist in the Province should take advantage of the opportunity to hear this valuable report and listen to a discussion carried on by the ablest men in the profession.

FRED J. CONBOY.

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No. 7

## EDITORIAL

### Dentistry Passing Another Milestone

PROGRESS in dental science and practice has continued unabated during the past decade, and particularly in the general recognition of the relationship between oral diseases and systemic conditions. This development has placed upon the profession an added responsibility in the treatment of dental disease. The difficulties encountered in bringing about conditions of oral health have led thoughtful practitioners, more and more, to think in terms of prevention. Practitioners realize the necessity for studying the whole case and basing treatment upon that broader study, rather than a more localized consideration resulting from a study of oral conditions alone. We predict that the next decade will witness still greater strides forward, and particularly in the raising of dental educational standards and the development of graduate and post-graduate work.

If Dentistry and Medicine are to co-operate and work side by side, it is absolutely necessary that Dentistry adopt similar entrance requirements to those of Medicine. Many colleges have already given notice of the adoption of this standard of entrance. Among the Canadian colleges, the Royal College of Dental Surgeons of Ontario is to be congratulated upon the adoption of a similar matriculation standard to Medicine in 1925. This involves one year of academic

work beyond Matriculation (known as Honor or Senior Matriculation) equivalent to one year of Arts. Ontario students in 1925 will require this standing before admittance to the Pre-Dental or first year of the five-year course. Thus the pre-dental year, in place of being of first year University grade, will in 1925 be of second year University grade.

The Ontario requirements in 1925 will thus be the equivalent of the New York standard of four years High School, two years of College work (Pre-Dental), and four years of Dentistry, effective in 1926, the only difference being that in Ontario the first year of Pre-Dental work is taken in High School or University, and the second year at the Dental College. A similar plan is followed in Medicine at Toronto, the Pre-Medical work being linked up with the medical course, rather than being entirely separated.

The Dental Department, University of Buffalo, has given notice of a similar requirement of two years of College work, commencing session 1924, and other colleges have indicated their intention to adopt higher standards.

These developments portend a remarkable development in dentistry and dental education during the next decade. Dentistry is passing another milestone. The profession will be trained to render better health service. The people will be better served.

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## Educational Work by Metropolitan Life Insurance Co.

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OVER three million copies of a pamphlet, "Care of the Teeth,—A Peep Into the Future," have been printed in English, 150,000 copies in Polish, 150,000 copies in Italian, and 51,000 copies in Yiddish by the Metropolitan Life Insurance Company. The pamphlet will also be printed in Spanish and French.

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**EASY METHOD OF REPLACING A BROKEN TUBE TOOTH.**—In short bite cases it is not extraordinary for a tube tooth to become broken, and it is a tedious and laborious task to grind in a new one to take its place, many times the result being far from satisfactory. This can be overcome by first grinding a new tooth approximately into position and setting with a synthetic porcelain cement of the same shade as the tooth. When polished finally with stones and disks the result will be equal in appearance and strength to the original tooth.  
—L. L. MANN (*Dental Cosmos*).

# ORAL HEALTH

A JOURNAL THAT STANDS FOR THE "OUNCE OF  
PREVENTION," AS WELL AS THE "POUND OF CURE"

Vol. 13

TORONTO, AUGUST, 1923

No. 8

## Deafness Viewed From a Dental Standpoint

H. O. BROWN, D.D.S., ROCHESTER, N.Y.

THE fact that certain forms of deafness are curable, by correcting the position of the condyle head within the glenoid fossa, has been too conclusively proved by the experimentation of several of our brother practitioners, for us to longer ignore our responsibilities in regard to this heretofore badly neglected joint.

To the person who has come into intimate contact with a fellow human suffering the embarrassment of deafness, even partial deafness, little need be said to interest him in this great work. Probably the loss of no other sense causes more embarrassment without totally disabling the victim than the loss of hearing. The attempts of kind friends to overlook or ignore the impediment, often only add to the load the recipient is already carrying. He knows by the extra attention he receives that a special effort is being made on his account, and this often only serves to make him feel himself more of a burden to his friends. They nearly always come to feel themselves social outcasts and become exceedingly sensitive, trying wherever possible to avoid contact with people, especially strangers. Often when they have been drawn into conversations they further embarrass themselves by their forced attempt to appear interested in a discourse which they cannot follow, asking questions on subjects already explained, and by the inattention of the rest of the participants, they are made to realize that they have again blundered. One who has not seen the pained expression on the face of an intimate friend can hardly appreciate the depth of humiliation through which the repetition of these slight occurrences causes the recipient to pass.

It has been the writer's privilege to correct several cases by the

simple procedure of placing a splint on the occlusal surfaces of the teeth, thus elongating the bite. (The details of the construction of this method will be taken up later.)

The gratitude of a patient released from a lifetime of suffering and ostracism, surpasses that received from any other accomplishment. To watch one patient emerge from depths of despair into which only a person realizing that they may be forced to face a lifetime of auditory darkness can descend, and once more take a bright outlook on life, regaining his old cheerfulness and self-confidence, is ample recompense for hours of study and repeated failures, for one must expect to have failures in a work as new and experimental as deafness handled from a dental standpoint.

If we can effect a cure by the addition of one millimeter to a full dentition, do we dentists realize the damage we may be causing when we insert full dentures, replacing from fifteen to nineteen millimeters with nothing to guide us but our sense of esthetics? How often do we listen to that oft repeated plea of an unsuspecting patient or one over-anxious for the immediate appearance of the finished dentures to "make them short, Doctor, so they will not show"? Do we realize that dentures are as truly splints used to "set" a dislocated joint as the bandages of the surgeon used to reduce a dislocation in any other part of the body? No surgeon is ever required in setting a fracture or dislocation to replace eighteen millimeters of lost dimension. He has the fractured ends of the bone to guide him, while we have nothing but our knowledge of the anatomy of the parts. He would never ask a joint of the arm or leg to function in a dislocated position, and yet we ask the temporomandibular joint to serve us in speech and mastication with scarcely a thought as to whether it is in its correct position or not. Skull after skull have been shown by men interested in this work where the roof of the glenoid fossa has been worn entirely through by the abrasion of the condyle.

The cases that have passed through the writer's hands can be grouped into three general classes. (Group "A"):

1st General Abrasion Fig. I. 2nd Malocclusion Fig II. 3rd Loss of Teeth Fig. III.

Group A

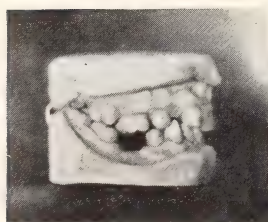


Fig. I.

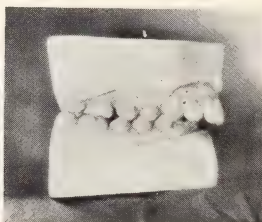


Fig. II.

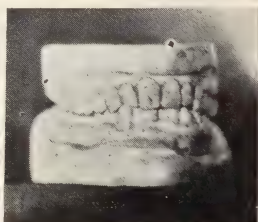


Fig. III.

The data on hand at present is insufficient to allow of a grouping in order of their response to treatment, but the writer has found that they seem to respond best in the order named. While we have no history of deafness in connection with the skull used in these illustrations, yet the similarity of abrasion on it so nearly conforms with that in Fig. I that it was considered permissible to use it to illustrate the probable position of the condyles in a Class I case.

Group "B," Fig. I shows a splint inserted between the teeth of the skull similar to that used to correct Fig. I of Group "A". The resulting space gained in the Glenoid fossa region is more plainly shown by Fig. II. Fig. III shows a group of splints used to correct various cases. The center splint is made of vulcanite entirely, and is

Group B

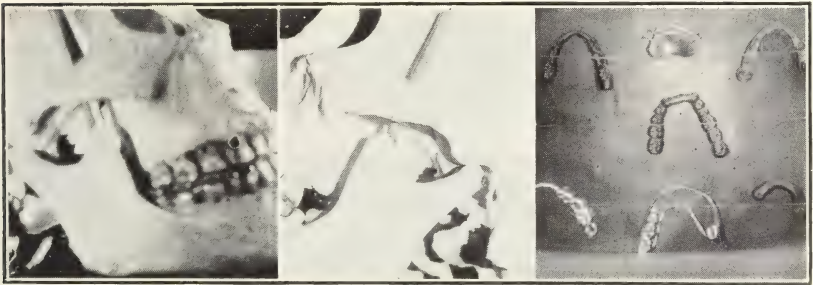


Fig. I.

Fig. II.

Fig. III.

probably the simplest to construct but the hardest to fit, and is apt to move a tooth out of position during the period of trying out. The writer has discarded this form, which is simply one-half of the well-known Kingsley Splint used in fracture work, for the ones shown in the top row at the extreme right and left. These are retained in place by means of clasps and consist of a series of occlusal pads joined together. This method, while calling for the extra work of making the clasps, is much easier to place and more readily cleaned by the patient. These little rubber splints are placed simply as temporary appliances to try out the case and make sure that the deafness is due to the condylic intrusion before attempting an elaborate building up of the bite. Once the case responds to treatment, one can employ any method which seems advisable to retain the condyle in the new position.

The excessive abrasion, malocclusion or loss of the teeth, allows the condyle to tilt backward and impinge upon the external auditory meatus, and it is this impingement that we wish to check. This can be readily understood when one realizes that the mandible does not swing as a hinge from the exact center of the condyle owing to the muscular attachments holding it in position, but rather from a point

approximately midway between the condyle head and the angle. This impingement can be felt by standing in front of the patient and placing the little fingers in the ears until they enter the *external auditory meatus* with the thumbs resting on the forehead and having the patient open and close the mouth. Often the pressure in this region is so excessive, that the patient experiences intense pain in attempting to close with the operator's fingers in position. As the mandible closes past its correct position, one can nearly always feel a decided backward thrust as if the condyle were going out of the Glenoid fossa. It is this last backward thrust that we wish to check.

Before attempting to correct a case, the Dentist should obtain as much of the history as possible. The patient should have passed through the hands of a reputable ear specialist and come to him without some structural defect, like a ruptured drum or an excessive amount of wax. The speculum shown in four sizes, Fig. I, Group "C", will aid in a superficial examination of the outer ear and will

Group C

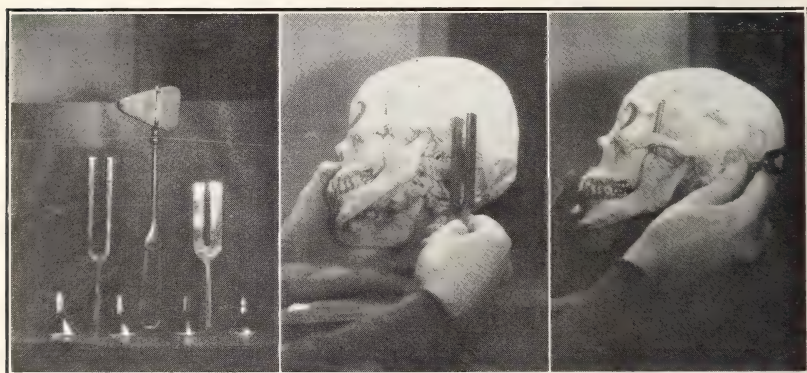


Fig. I.

Fig. II.

Fig. III.

show wax or a ruptured drum when illuminated by an electric light. A normal drum presents a white glistening appearance much the color of "Mother of Pearl". As a matter of record the tuning forks, Group "C", Fig. I, are very helpful, although a watch may be used if the same one is used each time, moving it away from the ear and having the patient raise his hand when the tick can be heard no longer. The patient should be asked to close his eyes or in his anxiety to show improvement, he may insist that he can hear farther than he really can. In using the forks, two tests should be made for each ear, first strike the fork a medium blow with a rubber mallet (Fig. I, Group "C") and place the fork over the mastoid process, Fig. III, Group "C", count the number of seconds the patient can hear the

vibrations, and set the number down as the numerator of a fraction. Strike the fork again and hold it over the External Auditory Meatus, Fig. II, Group "C". Set this number down as the denominator of the fraction (for example, 16 seconds for the first test or bone conduction, and 28 seconds for the second or air conduction. The fraction then stands at 16/28). This report can then be filed away until the next appointment, when the operation can be repeated and the results compared. In comparing the results, there are three things that should be taken into consideration before a correct result can be obtained.

1st Patient's general health.

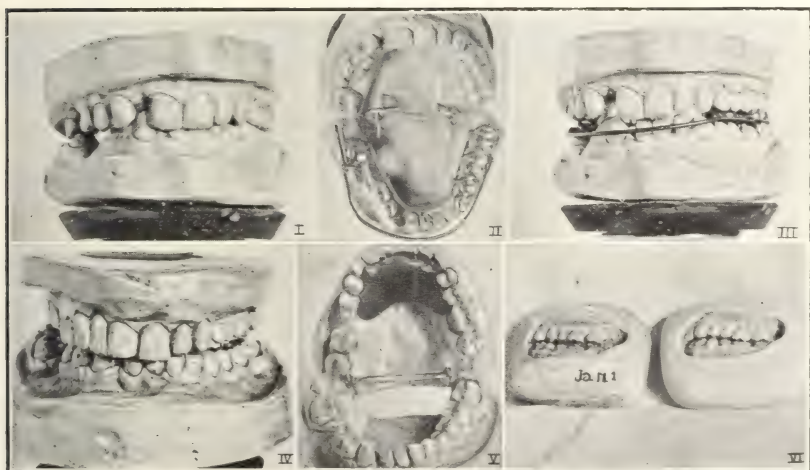
2nd Atmospheric Conditions.

3rd The fact that the patient knows what to listen for after one or two trials.

One should not expect a true test if the patient is not feeling as well as usual, or is especially tired, consequently the early hours of the day are better for the tests. As far as possible, a bright, clear day should be chosen in preference to a dark, cloudy or excessively humid day.

Group "D" shows the case of a young lady thirty years old.

Group D



She was just showing the first signs of deafness. The upper two bicuspsids on the right side, Fig. I., were out of occlusion buccally, and there was a very deep overbite present. Fig. I. With the fingers in the ears, one could feel quite a decided impingement. A series of occlusal pads, Fig. II., were made for the case, opening the bite enough to allow the bicuspsids to be drawn into position. A small palatal wire was placed in the upper, fastened to bands on the molars

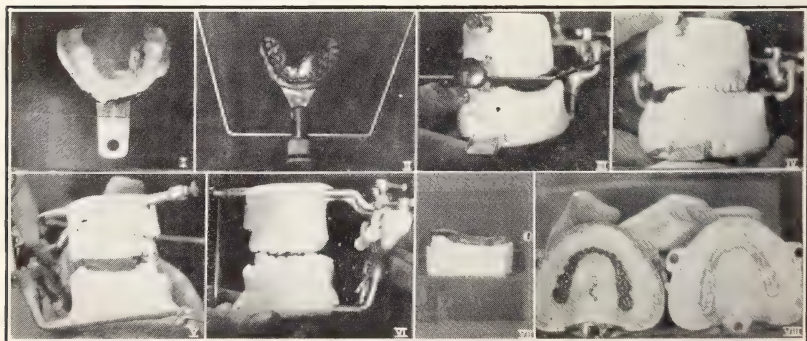
(not shown in illustrations) and an Angle expansion arch wire placed on the lower, Fig. II and III. The lower bicuspid were drawn out as the uppers were drawn in, until an occlusion, Fig. IV., was established. Upon removing the splint the posterior teeth on the left side stood apart the width of the splint, Fig. IV. A small vulcanite base plate, Fig. V, was placed, giving occlusion from right 2nd bicuspid to left bicuspid. This was worn continuously with instructions to chew hard foods as much as possible on the *left* side. At the end of the six months, the teeth on that side had been drawn into position, and a normal occlusion established, Fig. VI. In the meantime, the patient had lost all signs of deafness. About two years were used to accomplish this result.

#### STEPS IN THE CONSTRUCTION OF A SPLINT.

In making a temporary splint to try out a case, before attempting the more expensive and difficult gold splint for a finished case, the writer would suggest that clasps be made to retain it in place rather than allow the vulcanite to extend down over the buccal surfaces of the teeth, as will be shown in this case, as a splint made in this way, while calling for the extra work of making clasps for retention, is much easier to insert and less apt to move a tooth out of position through putting undue pressure on its buccal or lingual surface. If an all-vulcanite splint is found to press too hard at some point, that particular point is often very hard to find, and the time lost in finding it and seating the appliance is often more than the extra time it would take to make the necessary clasps.

The all-vulcanite splint is nothing more or less than one-half of the well-known Kingsley splint used in fracture work. If clasps

Group E



are to be used, they should be placed in position in the mouth and a plaster impression taken (Group "E", Fig. I). The upper impression need only give the imprint of the occlusal surfaces of the teeth, as it

is only to be used for articulation. The casts are now "run", a face bow bite taken, Fig. II., and the casts mounted on an articulator, (Fig. III).

The writer prefers a Snow articulator for this work, as it allows the lower arm to be dropped as a whole, (Fig. VI), and not simply swung open as a hinge. Experimenting with cases has shown that this procedure gives better results than simply opening the bite with a hinge movement. Right and left lateral check bites are taken, (Fig. IV), the slant of the condyle paths adjusted, (Fig. V), the lower arm of the instrument is dropped (Fig. VI) the amount it is considered necessary to open the bite, usually about two millimeters, and the case is ready for "waxing up". If clasps have been used, only the occlusal surfaces are waxed, but if no clasps are to be used, the wax can be extended down over the buccal and lingual surfaces of the teeth, (Fig. VII), keeping free from the gingival margin. The case is then articulated on the instrument, removed, flaked, and vulcanized. If of all vulcanite design it is well to cover the model with number sixty tin foil, (Fig. VIII). This allows enough space so that the splint goes to place easily in the mouth, and leaves a smoother surface on the inside which is easier for the patient to keep clean.

Once the splint is in place in the mouth, a very little "spot grinding" with a mounted stone and carbon paper will usually remove any high spots caused by vulcanization, and the case is ready for the tests and a tryout.

The writer has attempted, in the above article, to show the need for more thought in regard to the results brought on by the placing of prosthetic Dentures in the mouth. The insertion of any one of the splints shown in Group "B", Fig. III, is a very simple procedure, and the results are of inestimable value to the patient, providing we can effect a cure. The information on the subject is very limited at this time, and the need very great. If more dentists would try a few cases and record their results, we would soon be able to raise this great branch of prosthetic dentistry out of the experimental stage with a definite method of diagnosis and technique.

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## How To Look Nice

My neck is clean, my ears are too,  
And now my teeth I'll have to do.  
And then I'll brush and comb my hair,  
And fix my nails with greatest care.  
When I look clean Dear Mother's glad,  
But if I'm not she's always sad.

—*Juvenile Jingles.*

# Systematized Cast Gold Inlay Technic\*

BY O. S. CLAPPISON, D.D.S., HAMILTON, ONTARIO.

## PAST HISTORY OF THE CAST GOLD INLAY.

THE past history of the cast gold inlay has been as fanciful as the many colors of Joseph's coat. The technics have numbered legion, and the appliances have shown a variation from a pea-shooter to a cowbell. The bewildered operator has been deluged with the advice from one, to cast them hot; from another to cast them cold; to spin them fast; and to spin them slowly. His fancies have run riot, his opinions have been given full rein, they very often being merely opinions and not based on fact.

The late Alexander Graham Bell, during his lifetime, kept before his mind's eye, as a motto, these three words: *Observe, Compare, Record*, and his life's work bears testimony to his faithfulness to his motto. It is only by observing the various steps in each method of casting in use, recording the findings and comparing the results obtained, that ultimately we will come to any unanimous conclusion, improve our technic and arrive at the haven of our desires; namely, a recognition of the most acceptable method of casting and the universal adoption and standardization of same.

After fifteen years or more, of development and progress in the art and science of casting, our technics have been somewhat simplified and our problems have been greatly reduced, but there are still many obstacles to be overcome and many facts to be uncovered before the profession will accept as a standard any technic that has been advanced up to the present time.

I do not come to you with any dogma, creed, or hobby, but with an open mind, even as Diogenes with his lamp, looking for a few honest souls, and laying aside all bias and prejudice, will earnestly seek for a rose here, a lily there, ultimately composing a garland fit for any brow and disdained by none. It is not possible to get together on this problem with minds unclouded by pre-conceived ideas and convictions, and with an eye single to the advancement of our profession, for whatever technic one may favor, let us not forget that in the last analysis "our agreements are greater than our differences." Let us give all honor where honor is due, to the father of the casting process, Dr. Taggart, and others who, by following Dr. Bell's motto, have given us much valuable data as a result of their unceasing toil.

## WHAT IS A PERFECT INLAY.

Dr. Ottolengui says, "A perfect inlay must be an exact metal replica of a perfectly adapted, carved, contoured, polished, and scientifically manipulated wax pattern when such pattern is in the cavity in the mouth."

\*Read before the Chicago Dental Society, October 17, 1922

A perfect inlay is not our ideal of what an inlay ought to be. Idealism is a beautiful theme in every walk of life, but idealism in the science and art of dental castings is a harbor never reached, a pinnacle never scaled, and if we would approach the summit, it must only be by steps of careful discrimination, painstaking analysis, choosing only what is best and holding fast to that which is good; and while there must of necessity be inherent defects in any operative procedure which cannot be overcome, these defects may be due to materials, methods, or the limits of human accomplishment, but when we have eliminated every possible defect, we will have a perfect result.

#### PRESENT-DAY TECHNIC.

It requires no great exercise of one's imagination to observe how far short of the ideal we have come in the past. Nor is any process of elimination needful to arrive at the most commonly used technics continued into the present. For comparison, we will divide these into four classes.

(1) High Heat Technic—Heating to 500 degrees F. and over. Almost or entirely eliminating wax carbon residue, producing in the mold; dark brown residue at 500° F.; light brown residue at 600 to 650° F.; white (eliminated) at 700° F.

(2) Low Heat Technic—Heat not to exceed 320 to 400° F.; the wax is absorbed into the investment and carbonized to desired degree of carbonization.

(3) Low Heat Technic—Eliminating wax by quick steaming or through sprue hole (low heat because center of mold is not heated over 250° F.)

(4) Hit or Miss Technic—Over open flame, or on plate, in contact with rings. The latter technic, I hope, is almost obsolete, as it must be obvious to the least thoughtful intellect that an understanding of the effect of heat on the materials used in each step of the casting process, and a strict adherence to certain rules, is absolutely essential to the production of uniform castings. No longer are we content to gaze with rapt admiration on an occasionally accurate reproduction in gold of our wax pattern. Our goal is one hundred per cent. castings, and with present day systematized procedure, almost one hundred per cent. results may be obtained by the careful technician.

#### MATERIALS.

The manufacturers have given us materials almost ideal for our purpose. Let us look for a moment at those commonly used.

*Waxes.* Inlay waxes are composed of beeswax, paraffin, resin, in proper proportions, to which is added coloring matter. These constituents have been so well blended that it is unnecessary for me to discuss the relative merits of the various constituents of the waxes. The better combinations of waxes may differ in hardness and elasticity, but when manipulated, they exhibit certain physical characteristics common to all waxes, namely, expansion, contraction, elasticity.

Taggart's and Caulk's waxes seem to come nearest to the ideal for our requirements, but call for a more careful handling than others. They are somewhat harder, will take a sharper impression without crawling, when properly manipulated, and because of the higher temperature required to soften, hold their shape better in the mouth and when kept for subsequent casting. Kerr's wax, and others, are softer and more pliable, probably more popular because of these attributes.

#### ACTION OF WAXES.

Dr. Price and others have given us sufficient proof of the stretching properties of wax and the results of careless technics. When wax is softened and manipulated, the molecular arrangement is interfered with and the consequent re-grouping occurring during process of cooling causes a stretching which, if not minimized, will have a serious effect on the fit of the finished casting.

Dr. Van Horn says that casting wax has a coefficient of expansion of one per cent. for every 20° F., in rise of temperature. If this be true, and it seems reasonable, then the coefficient of contraction being equal to the coefficient of expansion, we have a volume change of approximately two and one-half per cent. between the temperature of the water in which the wax is heated, namely 125° F., and the open mouth temperature of 80° F. to which the wax is chilled. Our great problem is to know how much shrinkage we have to contend with when this expansion and contraction is completed and how best we may minimize same.

May this not be best minimized by so shaping the cone of wax that the soft tip is inserted into the cavity as nearly as possible at right angles to the gingival seat, thus concentrating and condensing the wax against the gingival wall? This close relationship may be somewhat lessened as the temperature of the wax recedes to the temperature of the closed mouth, but if the pressure is kept constant, and a stream of water at room temperature directed onto the wax, the force of the occlusion, and that of the matrix, being greater than the intermolecular attraction of the wax, it is chilled and the elasticity fixed at a temperature which prevents it from assuming any shape other than that of the cavity.

Some waxes are put up in stick form, necessitating a re-shaping for convenient use, so as an additional precaution if stick wax is manipulated to cone shape, so that tip of cone may be softened and hard end used as a plunger, it is wise to chill whole cone, then re-heat to desired softness, without further manipulation, before inserting into cavity.

Wax at 80° F., is somewhat pliable, and by use of sharp curved cutting instruments, the wax may be cut and shaved off, buccally and lingually, always cutting as much as possible toward the margins, by this means accomplishing a certain amount of burnishing. This is accentuated by the use of china silk in strips, used in proximal surfaces, burnished toward the margins, and wrapped around the pliers

for pits and fissures. These help to re-adapt the wax pattern to the cavity wall, thus compensating somewhat for any loss in volume consequent to the heating and manipulation. Now the question arises, if the contraction of the gold is thus somewhat overcome in the bulk at the margins, what about the volume of cement between the casting and the tooth structure, other than the margins? It seems that we are at the cross-roads referred to by Dr. Ottolengui. Down one road go those who make gold fillings retained by cement; down the other, those who prefer cement fillings retained by gold. I am frank to confess that clinical observation in using a systematized technic has certainly proven that the vast majority of those inlays, in which cement at the margins is not discernible to the naked eye, or the joint between the filling and the tooth is not evident to the touch of a very delicate explorer, show a very high percentage of success, if the proof of the pudding is in the years of useful service, irrespective of whether they belong to the former class or the latter.

#### INVESTMENTS.

Basis, or binding material, of all investments is plaster of paris and the heat resisting component silex. The greater proportion of plaster in the investment, the smoother will be the casting, but the more liable to check under excessive heats. Inversely so, the greater the silex element, the greater the heat resisting properties, but the more porous the investments and the rougher the castings.

Plaster of paris is prepared by slowly heating the native gypsum sufficiently to drive off the first molecule of water of crystallization, which begins to be given off at 175° F., and is entirely eliminated at 260° F. (2) then grinding the gypsum to powder. The user adds again the molecule of water of crystallization together with free water and re-crystallization takes place.

If, in the burning of the gypsum, the temperature be raised to, or about, 480° F., and then ground into a fine powder, it will be found to have lost its power of dehydration, and in this state it will not set when mixed with water, and it is said to be dead burnt. In other words, in a high heat casting process, the investment assumes a dry, powdery form, entirely unfit for casting. Hence the necessity for some uniform method of accurately measuring and controlling the heat to which the investment is subjected.

I prefer an electric furnace with a thermometer in the top. I have used a Maves furnace for several years with gratifying results.

There are many simple methods of constructing a heater. At the Royal College of Dental Surgeons, Toronto, W. E. Cummer has had the students make one cut of a standard electric switch box lined with one-quarter inch asbestos mill-board. A coil is placed in the bottom with switch attachment and shelf above on which to place the rings.

This may be modified to use with gas burner, a plate being placed above the opening at the bottom to spread the flame. A thermometer is placed in the opening in the top.

## GOLDS.

Pure gold, originally the most in vogue, proved too soft, pitting and wearing of contacts resulting. The ease with which it burnishes and draws over margins is the great factor in its favor.

Dark 22k. gold,—a copper alloy may be used with fair results, being preferable to the silver alloys and the lighter golds on account of its hardness.

I prefer Tinker's "T" and "TT" platinized gold, which is practically as follows: For inlays: 2-3 Ney's dark 22K. gold and 1-3 S.S.W. cast clasp gold; for abutments: 1-3 Ney's dark 22K. gold and 2-3 S.S.W. cast clasp. These golds are very hard and will not pit on the surfaces, or wear on the contacts, as readily as the softer gold. A combination of pure gold and platinum will also give excellent results if combined in proper proportions.

## THE PRESENT STATUS OF THE CASTING TECHNIC.

The present discussion as to the most acceptable method of casting centers on the advisability of retaining, partially dissipating, or entirely eliminating the wax and carbon residue in the mold.

## LOW HEAT ELIMINATING WAX.

A technic eliminating the wax entirely by steaming out process, is undoubtedly the quickest and easiest method of making a given casting, and in many instances where time is the all important consideration, must be resorted to. The results in many cases are very pleasing, but are not, however, in my opinion, as uniform as those of a low heat technic.

At no time does the investment become heated to over 250° F. The binding material of the investment, plaster of paris, is not disintegrated, but the gold picks up a little silix during the casting process, and occasionally, a slight binding results, especially where the dove-tail is accentuated in a cavity preparation.

The casting is as smooth, probably smoother, than when a high heat is used, but it is not possible to secure the burnish that is present when the wax is retained and carbonized.

In a high heat technic, in which the temperature is sufficiently high and of such duration that the wax is completely volatilized, the investment, as we have seen, assumes a dry, powdery form unfit to produce accurate castings, and the writer cannot see any necessity for this procedure, or advance any arguments in its favor.

Where the wax residue has been violated, there appears to be some enlargement of the casting, some interference with the walls of the mold, some brushing off, it may be of particles of investment at the narrow points in the mold, the silix thus picked up being visible on the casting, producing relatively an enlargement of the gold over the wax pattern.

## LOW HEAT MAINTAINING WAX.

Carbon is one of the best deoxidizers of gold that we have at our

disposal and, if eliminated, the very substance most valuable in the prevention of oxidization of the gold is thereby lost.

When the wax is retained in the mold, and carbonized, the carbon residue seems to fill the pores of the investment and acts as a wall between the investment and the molten gold, preventing the rubbing off of the line particles of investment by the gold as it passes into the mold, thus eliminating this binding so often encountered. This is especially exemplified in M.O.D. cavities.

By proper dissemination of the wax through the investment, and heating to proper temperature, the degree of carbonization may be produced and the length of time and temperature producing the best results adopted. This takes time. Time truly is a consideration; time is money to the busy dentist, but one hour consumed by the assistant in the laboratory cannot compensate for fifteen minutes lost at the chair grinding and polishing a casting in order to make it go to place in the cavity.

Very little brushing is required to remove the investing material after casting is made, the casting coming out smooth and bright. The casting thus made is the nearest to a reproduction of the wax pattern in gold, both as to fit and polish, that I have been able to attain.

#### SHRINKAGE OF GOLD IN RELATION TO M.O.D. CAVITY PREPARATION.

It would be presumptuous on my part to enlarge on cavity preparation. So many excellent preparations have emanated from skilled operators in Chicago and the middle west. One or two points, however, are pertinent to the topic under discussion.

Dr. Ward (4) says that the coefficient of shrinkage for an inlay one quarter of an inch in diameter is 0.0016.

Gold, unfortunately, contracts toward its largest bulk, which in the case of an M.O.D., for example, is toward the proximoclusal angle of the gold and in all directions away from the occlusal, and with a drawing together of the axial walls, the metal at the gingival shrinks toward the largest bulk, namely, the proximoclusal angle; causing relatively a thickening of the gold over the step, with the result that the inlay binds on seat of cavity and will not go to place, consequently a space is apparent at the proximogingival margin. This physical property of the gold cannot be overcome by a quick cooling, cold mold, or other means, and is particularly noticeable in three-quarter and full cast crowns; an amalgam die being necessary to overcome this property by swaging to place.

To overcome the contraction in many M.O.D. preparations the wax must be relieved or gold ground away over the step. It is also advisable to have at least a 15 per cent. flare to lateral walls and a 15 per cent. taper to axial wall of cavity. The gold will condense slightly in the lateral walls, pure gold more easily than the alloys, and if relieved over step, the inlay will seat at the gingival before axial wall of inlay binds on the pulpal wall of cavity.

In the three-quarter crowns for anterior teeth, as prepared by Dr. Tinker, little loss of length is encountered due to the fact that gold is of almost uniform thickness, the increased bulk across the occlusal not being of sufficient volume to seriously affect the casting.

#### SYSTEMATIZED CAST GOLD INLAY TECHNIC.

My technic is simple, yet accurate and efficient, one that requires no special high priced equipment, yet a technic that any one with an average amount of skill may follow easily, and follow with accurate results. I believe lower heating and lower temperatures make for simplicity and exactness, and even allowing the greater factor of personal equation to enter, is it not easier to do the same things many times a day with the same result, than to be a creature of variable moods and vary our technics with every varying disposition?

#### GINGIVAL MARGINS.

Gingival margins should be exposed by packing back tissues so that trimmers and chisels can be used, Tomkin's Prophylactic Files, Nos. 1, 2, 3, 4 being very useful for this purpose. When dull, if sent back to factory for re-sharpening, each time they become smaller and easier to work in between close gingival contacts. Chisels used: Black's Chisels Nos. 77, 78, 79 and 80.

#### APPLIANCES AND INSTRUMENTS NEEDED IN CASTING PROCESS ARE:

1. Dairy thermometer. 2. Cold cream jar and ear syringe. 3. Measuring glass. 4. Taggart's weighing device. 5. Dry plaster bowl and spatula. 6. Furnace, gas or electric, with thermometer.

#### WAX CARVERS.

I have found the following wax carvers very useful: Ebersole No. 1, Schonbeck's Nos. 1 and 2, Ward No. 1. Also two or three of my own design.

#### MATRICES.

Blue Island Aluminum Bands, 36 gauge, are indispensable for anterior three-fourths crowns, and for the posterior teeth in places where the adjacent tooth is missing or where contacts permit its use. They are heavy enough to permit of concentration wax and yet thin enough that they can be easily slit and removed before carving the wax impression.

#### WAGNER MATRIX.

The Wagner Matrix, or similar, for compound cavities is an indispensable article. The square shoulder of the holder forces the band against the tooth and holds the band firmly while it is being tightened, thus forcing the wax into every part of the cavity.

#### HANDLING WAX.

Fix a handle (a glass-handled push-pin suggested by Dr. Chayes) to a large cork and attach several pins to the under side, and on these

pins spear the cones of wax; the cork and wax are then placed in water at 125° F. When sufficiently plastic remove and dip tip of cone into water 130° F. repeatedly to soften the tip and use the hard end as a plunger to force the soft wax into every part of the cavity.

If a matrix is used, and Wagner's matrix is invaluable for compound cavities, keep the wax slightly ahead of the matrix and force into place. When patient has closed teeth, tighten matrix gradually and force the wax into every part of the cavity, then chill to mouth temperature previous to relieving the pressure. Carve as much as possible before removing the matrix, carving occlusal with instruments that carve to a pre-determined angle, namely, Schonbeck's Nos. 1 and 2. Remove matrix and carve proximal with curved wax-carving instruments, leaving if possible a small excess of wax above margin, which excess is smoothed off by rubbing and burnishing.

A good curved carving instrument may be made of No. 5 Rival Instrument, (Clev-Dent) by sharpening the blade above and below, or one of my own design may be used for this purpose. Finish the carving of the occlusal and then burnish with china silk, held between the fingers for proximal surfaces and wrapped on pliers for pits and fissures, leaving a tuft at the end which will, if sufficient care is taken, work into the fissures and burnish without scratching. In some cases the contact between the adjacent teeth is so close that the use of a matrix is contraindicated. In this event, insert the tip of wax cone at right angles to the gingival seat and use the fingers of the left hand as a matrix, buccally and lingually, and thus condense the wax in all directions. This is the only instance in which I would favor softening of the occlusal in order to obtain the markings of the opposing teeth. The close contact with the excess will hold the wax fairly well into place and a partial carving may be accomplished. By repeatedly, carefully, softening the surface wax before removing the excess in the interproximal space, the occlusal may be carved to its normal bite.

It will be found extremely difficult, under ordinary circumstances, to soften the wax on the occlusal, after the interproximal wax has been removed, or after removing a matrix, and to again apply pressure to secure the markings of the opposing teeth, without causing the pattern to become warped.

The wax pattern is removed with an explorer. If the pattern is to be kept for a subsequent casting, a wineglass with sticker attached, on which patient's name is written, is placed on shelf and pattern placed in water in same, which will be room temperature.

Wax pattern is placed in hollow of the hand with sprue warmed in bunsen flame and inserted into wax.

#### INVESTING.

There are many factors entering into the investment of the pattern, all of which have an important bearing on the final result, among

these being the length, diameter and thickness of metal ring, the density of investment materials, and the distance of the wax pattern from the end of the ring.

It is obvious that the more porous the investment, the greater the ease with which the contained air will escape by the incoming molten gold. Some operators advocate the double investment, with the more dense investment, adjacent to the pattern, the whole mass then surrounded by a very porous investing material, the claim being made that a smoother casting and sharper margins result from this procedure. I believe this to be advisable when casting large pieces, as saddles, etc., and sometimes in these large castings a wax lead is necessary to allow a gateway for the escape of contained air. But in the casting of smaller pieces, such as we have under discussion, the results do not seem to justify the expenditure of time necessary for the additional mix. If the operator will bear in mind the factors before mentioned and place the wax pattern as near the end of the ring as safety will permit, the investment will be found to be sufficiently porous to permit the air to escape and gratifying results may be obtained for the extra care.

The thickness of the ring will have an effect on the amount of heat required to affect wax. The ring we will consider will be a Roach.

The wax pattern is now mounted on sprue-former and washed with equal parts of alcohol and water to remove blood and saliva which may have adhered to same, afterward washing the wax in water at room temperature, to overcome chilling by alcohol wash. Blackwell (5) says: "Evaporation of alcohol from a wax covered thermometer-bulb caused a lowering of temperature of thirteen degrees F. after expiration of thirty seconds, and of sixteen degrees after sixty seconds. The same wax covered bulb, washed with room temperature water, caused a change of five degrees after thirty seconds and eight degrees after sixty seconds." Therefore, this appears to be a necessary precaution in maintaining, as nearly as possible, our uniformity of technic.

On bench in laboratory a handy article to have is a cold cream jar, kept filled with water, which will be at room temperature, averaging probably around 70° F. A rubber ear syringe is kept in jar for convenient use and will hold just about enough water (5 drams for Roach ring) for one casting and may be used to place water in measuring glass, as a drop may quickly be taken out. It is almost indispensable in transferring water from weighing device to rubber bowl.

I have tried every investment of reputation on the market, have combined silix with plaster, and graphite, but the best results have been obtained with Kerr's Combination Investment, which has proven sufficiently porous to permit of free access to the escaping air, at the same time being dense enough to produce a smooth casting.

The five drams are measured out and placed in the Taggart balance and enough powder is added to Taggart's weighing device to

balance the water. The water is put into a dry plaster bowl with the aid of the rubber syringe. The investment powder is sifted into same, spatulated very little, but bowl is rotated sufficiently to allow all bubbles to escape (three to four minutes with Kerr's Combination investment being an average mix). When sufficiently mixed, paint the pattern, using a camel's hair brush as an applicator, and pour the material into the ring. It is best to wait until the process is so far advanced that the investment will almost maintain its position as this minimizes the chances of bubbles forming around the wax pattern.

If bubbles are present on the casting, it is due to faulty investing, sufficient time not having been allowed for bubbles to form and disappear.

The investment is left to set from forty to sixty minutes. Up to one hour it increases in crushing strength and best results are obtained if not left longer. Under no circumstances should investment be left to set over night, as in doing so, the uniformity of our technic is lost. The free water of the investment evaporates and experience has taught us that an air-dried investment is more liable to check than one dried by heat after having been allowed to harden for a given time.

#### HEATING.

The ring is now placed in furnace, on low, and heat is gradually increased to 105° F., the melting point of wax, 145° F. (Taggarts) which takes about twenty minutes. During this time the investment will have dried sufficiently to act as a blotting paper, absorbing the wax as it melts, and not allowing it to bubble out of the spruce hole. If it is allowed to bubble out, explosions are caused in the mold and this seems to produce a roughness on the walls.

If several investments are burned off at one heating, a slightly longer time will be required than if the furnace contains only one or two.

The heat is rapidly increased to 400° F., taking about twenty minutes, and held there for one hour and a half. If the rings were to be taken from the heater and opened, at the expiration of this time, it would be found that the wax has been carbonized to a slate black color, which degree of carbonization I believe gives the best results.

#### CASTING.

The amount of gold for a large inlay should not be in excess of 5 dwt. of amount required for inlay, (for a small inlay the excess should be considerably less), and should be cast at a temperature as little above the melting point as will give a sharp casting. Super-heated metal injures a mold, so use just enough heat to fuse the metal and to keep it fused until the air is dispersed and the mold is full of molten metal. Fuse metal with oxyhydrogen flame or similar.

Clean the gold each time it is used, on a charcoal block, with equal parts of potassium nitrate and borax, thus eliminating any elements that may be picked up during the process of casting.

It is with a great deal of fear and trepidation that I even mention hot mold, or cold mold. Seeing, however, that I have mentioned the topic, and still live, it might not be amiss to point out the advantages of a funnel shaped sprue-former. A good casting machine is one in which the gold is transferred from the crucible into every part of the mold and cooled in the shortest space of time. A good casting machine is essential to good casting and there are quite a number of such on the market. A machine in which the air pressure is registered and kept uniform, undoubtedly has many advantages. The Taggart machine has long been the machine par excellence and after many years it still maintains its supremacy.

I use a Roach centrifugal machine, because of its simplicity of operation and smoothness of motion. The gold is quickly transferred from the molten to a solid condition once the molten is applied, and the motion serves to cool the gold quickly.

A funnel-shaped sprue-former accelerates this motion by a small fraction of a second and therefore is preferred.

#### CEMENTATION.

Finish inlays in pits and fissures before cementation by use of Inlay Finishing Burs, Nos. 1, 2, 3, Clev-Dent, followed by felt cone and wheel brush on a lathe chuck.

The cement should be mixed thoroughly to a thick, creamy consistency and the cavity almost filled. The average filling should go to place with a tap from orangewood stick and leather mallet, or an orangewood point in an automatic mallet.

It is wise in M.O.D. castings to apply the necessary force from two points, parallel with the long axis of the approximal portions of the inlay, by notching a stick until it rests on these two points. Hold the inlay under pressure until the cement has fairly well set, and when all danger of the casting moving is past, the margins are disked where possible and any stoning is left until the cement has set, or for another sitting.

Every cavity should be so prepared that the inlay will act as a wedge, forcing out the excess of cement and compressing the remainder into the smallest space possible.

#### GINGIVAL MARGINS.

The gingival margin of the average inlay has long been the bane of the prophylaxis specialist and of the periodontist. This unnecessary labor might be considerably lessened if more care were taken in the trimming and finishing of same with files and gold trimmers.

#### CONCLUSION.

In conclusion, I would pay a silent tribute to those who have made possible the systematizing of a cast gold inlay technic, a tribute of sincere appreciation for their unselfish efforts, for their unceasing toil. They have gathered together and we have builded, and if this build-

ing is so fitted together that someone may bridge over a few difficulties, and be helped to the better understanding of their casting technic, I will feel amply repaid for my efforts.

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### DISCUSSION.

R. E. Blackwell, Chicago, Illinois: Someone has said that, given a good cavity and a good wax model, he could make good inlays by a number of methods. I think that is true. First in importance is the cavity preparation and, second, the wax pattern.

The outline form for the gold inlay cavity should not differ to any great extent from the outline form for a cavity for an amalgam filling or a gold-foil filling. There are a few men who seem to think that because an inlay is put in with cement the margins are protected as they are not under other fillings and that the outline form need not be extended to include all the area of liability. Certainly the margins of the inlay are no more immune to caries than are the margins of any other fillings.

We all know that the gold-foil filling takes advantage of the elasticity of the dentin and that the dentin exerts a grip on the filling. In preparing cavities for gold fillings, most operators have prepared cavities with flat seats and definite angles for resistance form, not depending upon the grip of the elasticity of the dentin alone to prevent the filling from moving under the stress of mastication. I maintain that if it is necessary to prepare a cavity with a flat seat for the gold-foil filling, it is doubly necessary to prepare a cavity with a flat seat for the gold inlay, so that the inlay will not have a tendency to move under the stress of mastication. The retention form should be considered with care. The dove-tailing, if that method is chosen, should be done in such a way as to cause a definite interlocking of the inlay and the tooth. If the dove-tailing is very definite the inlay cannot help but go to its proper position when placed in the cavity for cementation.

Finally, the cavity for a gold inlay must have the undercuts removed and the walls must be smooth. It takes time to do that, much more time than to prepare a cavity for an amalgam filling or even for a gold-foil filling. We must have the proper tapering of the walls and the walls must be smooth. I have talked to many men with the purpose of getting their ideas of this matter of cavity preparation for gold inlays. I thought it might be a good idea to judge of their cavity preparation by getting the length of time they thought necessary for this work. I asked, "how much time do you think necessary for the proper preparation of a proximo-mucclusal cavity in a molar tooth for a gold inlay?" I asked thirteen men,—I will not mention their names but they are all men of recognized ability and only two said less than half an hour. Six of them said forty-five minutes was a minimum in the average case. One man I called up said, "I was talking with so-and-so at luncheon on that very subject and we agreed that forty-five minutes was the minimum time." Some of them said that they allowed an hour for an appointment and spent most of it on cavity preparation. I think this gives you a good idea of what good men consider necessary in the way of time for cavity preparations. We must eliminate the thirty minute appointments if we are going to do good inlay work.

Dr. Clappison mentioned the difficulties involved in using a matrix to

secure a wax pattern where the teeth were thick necked or had fallen together on account of abnormal interproximal wear. It seems to me, that such cases call loudly for separation. We should provide interproximal space and secure the full mesiodistal breadth of the tooth for that inlay, or perhaps a little more than the full mesiodistal breadth of the tooth.

As far as the laboratory technic is concerned, I can heartily agree with almost everything the essayist has said. We must have a standardized laboratory technic. As he has suggested, his may not be the only one, but we should have a standardized technic. I think each man must decide for himself what his shall be. I do not believe we have any right to make inlays unless we are willing to spend a little time in the laboratory now and then and find out whether or not we can make inlays that actually fit the cavities they were made for. In an article by Dr. Ottolengui which appeared in the "Dental Cosmos" for 1915, he said to avoid extremes of temperature in making gold inlays. That thought has remained with me. In softening the wax do not overheat. The water used in mixing the investment material should be at room temperature. Do not raise the temperature of the water and expand the pattern because you may cause distortion of the pattern. In dissipating the wax, use the low heat dissipation method. Some time ago I was trying to dissipate wax at about 320° F. At that time I was using the kind of thermometer commonly used on a vulcanizer; but since I have had a more accurate thermometer, and one of Dr. Maginnis' ovens. I have found that it takes more heat than that. I have to raise the temperature to 400° to get accurate castings.

I should like to say a word or two about alloys. Some time ago there were published in the Bulletin of the Chicago Dental Society some results of tests made to determine the hardness of the various alloys for casting, and it seemed that because some alloys tested very hard and showed a very small percentage of shortening under different pressures they were considered the best to use. I will give the results of a few of these tests. Pure gold under one hundred pounds pressure was compressed four and one-half per cent. Under two hundred pounds, nine and one-half per cent. Under three hundred pounds, sixteen per cent. As the average bite of the normal adult man is about 175 pounds, it would seem that pure gold is too soft to stand up well under the stress of mastication and to withstand interproximal wear. If we are going to use pure gold we should harden the occlusal surface with solder; the contact points also should be hardened with solder.

Dee's No. 2 special inlay gold was shortened 1.92 per cent. under two hundred pounds pressure. That is very hard gold, and it might give the idea that it would be ideal to use, but in my opinion it is not the ideal one. It is too hard.

S. S. White special inlay gold compresses about two and one-half per cent. under two hundred pounds. This also is too hard.

I believe that an alloy for a gold inlay should be soft enough to permit of trimming in the mouth in much the same fashion that gold-foil fillings can be trimmed. It should be hard enough to withstand the stress of mastication and yet not be more resistant to occlusal wear than is the enamel of the tooth.

At present it seems to me, that 22 carat gold comes nearest to meeting these requirements. It is soft enough to trim away in the mouth, and yet it is hard enough to withstand the stress of mastication.

A word about contour and contact. If a gold inlay has a place as a filling material it has earned that place not because of the decreased wear and tear on the patient and the operator, but because it gives us an opportunity to make a perfect proximal contact and a proper contour. It gives us an opportunity to try as many times as we like to make that con-

four and contact ideal. We may make good contours and good contacts with amalgam fillings and with gold-foil fillings, but if we take off a little too much in finishing we will have to do the operation over or do a part of it over in order to get the result we desire. In the gold inlay work we may cast our gold inlay without attempt at contact, as many of us do, place the inlay in the cavity to be sure that the marginal adaptation is perfect, mark the place where the contact is to be, and form the contact point with hard solder. The inlay may then be replaced in the cavity and the contact point tested for tightness, for buccolingual width and occluso-gingival width. When it is perfect the inlay may be set. I think for that reason, if for no other, the inlay has earned its place, probably the first place as a filling for proximocclusal cavities.

C. N. Johnson, Chicago, Illinois: We are likely to forget history but Dr. Clappison made the remark in his paper that Dr. Taggart was the father of the casting method.

Let us go back and think a little of history. When inlays were first made they were made with the matrix method, and in many instances very beautiful work was done. That was long before the Taggart method of casting was introduced. We were trying to perfect ourselves in that technic as best we could and in some instances got good results, but when Dr. Taggart came along and gave us the cast method what happened? Instantly the land was filled with the odor of burning wax, and we are smelling that odor yet. This profession will never be able to pay Dr. Taggart the tribute he is entitled to. The name of Taggart will live in the dental profession as long as we try to save teeth.

Another thing, Dr. Clappison said something about condensing the wax against the gingival wall. We cannot take a piece of wax and simply push it into a cavity and get the best results. The wax must be condensed, and the pressure must be maintained over the whole area with the thumb or finger.

Now the question of high heat and low heat. There is no doubt that an investment is left in much better condition if we dissipate the wax with slow heat. There is no question about that. As Dr. Clappison has said, if we use high heat we leave the investment in almost a powder form. Yet there are exigencies that arise that necessitate the latter method. I think it will aggregate about three hours if we use the slow heat and it is not always possible to spend that time, even in the laboratory on these cases. I am not making a plea for high heat, but sometimes we do find that the higher heat does come out well. In every case where we can we should use the low heat method.

When Dr. Taggart brought his method out, he gave us a technic which was more carefully worked out than that of any other process ever introduced in dentistry, and the fundamentals are almost the same today as when he gave them to us in 1907. He told us then why to use a cold mold. There are, however, times when an inlay is needed as rapidly as we can get it, and I remember when a clinic was given here by the Illinois State Dental Society on its fiftieth anniversary, a lot of inlays were made for test purposes and one gentleman brought me some particularly beautiful castings. I complimented him and he said, "Yes, Doctor, I cast those in a hot mold." It jarred me just a little bit,—we do get jarred sometimes.

I want to say a word about the matter of cementing an inlay to place, and to make a confession. Dr. Clappison intimated that it was not necessary to say anything about so simple a process as that before this Society. I want to confess that my chief difficulty in securing satisfactory results in the matter of gold inlays has been in cementing those inlays to place. I have been able in many instances to get a result that pleased me, I do not mean that it satisfied me—we are never satisfied, or should never be, but a result that pleased me, with a good occlusion so that I knew there was no undue impingement, and the contracts good, and then have cemented the inlay to place, and the first remark the patient makes

is, "Oh Doctor, that hits!" I have had that happen so frequently that it is to me the bugbear of inlays. I do not seem to be able to place an inlay always in exactly the same position when that cavity is filled with oxyphosphate of zinc that I can when the cavity is empty. Possibly I have been making a mistake in one particular. I believe that when we cement an inlay we are sailing all the time between Scylla and Charybdis. We are on the one hand making the cement so thin that it is lacking in stability, or we are making it so thick that it will not permit the inlay to go perfectly to place. I believe my chief difficulty is in mixing the cement too thick.

I enjoyed Dr. Blackwell's discussion very much. He mentioned a thing I think very important, and that is the cavity preparation. I believe the work of cementing is facilitated greatly by the proper preparation of the cavity, giving it flat seats for the inlay to rest upon. If you have a flat seat and force an inlay to place, it is more likely to go perfectly to position than if the inlay is situated on a curved base. Another thing is that we want to make pressure, especially in a large inlay, over as much of the surface as possible, and I do not rely for the perfect seating of an inlay upon the way Dr. Clappison suggested. I do not use an orangewood stick or an automatic mallet, but I use a steel plugger and a heavy lead mallet covered with leather. I want a mallet which carries the impulse a long distance. The light steel mallet does not carry the impulse far but the soft heavy mallet does. A boy in my chair expressed this very beautifully one day. I was inserting a gold-foil filling and had my assistant use a soft heavy mallet. Then I picked up the light steel mallet and used it to harden the surface of the filling. When the boy got out of the chair he picked up the heavy soft mallet and said, "This thing jars you right to your feet, but this little fellow (pointing to the small steel mallet) just stings the tooth." That expresses it perfectly. In an M.O.D. inlay, when I do not feel sure of getting the impulse over the entire area, I use some pink unvulcanized rubber and then have the patient bite down as hard as possible. I do not use red rubber because it is not so satisfactory, but in some instances with the pink rubber the patient can do a better job than I can.

Dr. Clappison mentioned the fact that these gingival margins were the bane of the man who practised oral prophylaxis, and it is a fact that an overhanging inlay margin is a bad thing for the gum. But I do not think it should ever be necessary to use a file on them after they have been cemented. We should put the inlay to place, test the margins with a fine explorer and trim the margin out of the mouth, so that there are no overhanging margins. Dr. Blackwell has said that it does not seem possible to prepare an inlay out of the mouth and have no overhanging margins here and there, but if it is ever possible it is at the interproximal area.

As I look back over the whole development of the inlay process and think what has been accomplished even in a few years, I am most optimistic about the future in this particular line of work. I am an optimist in dentistry anyway. As I see these young men coming along and bringing us new ideas, bringing new blood into the profession, I am inspired.

P. A. Pyper, Pontiac, Illinois: You and I today are doing a lot of things that we think are absolutely essential and fundamental when they may only be an incidental. We are trying to make ourselves believe that a wax can be melted and molded and expanded and not come back. We are trying to believe that an investment compound may be mixed up into a plastic mass and that we may then do anything we wish to it without having it change its form. That is impossible with any investing compound we have today. Heat will expand and cold will contract them, and this same physical force is true in regard to metals.

When we have an excessively large gold inlay we will get the

effect of this expansion and contraction, although in a small inlay this will not be perceptible.

The Boston College of Technic has tried every known physical force used in casting to try and prevent the molten mass of gold from shrinking when cooling and found it was impossible to overcome the shrinkage.

Some of our men have been trying to use a centrifugal machine and others air pressure or air suction to overcome this shrinkage, but up to date there is no machine that will overcome this shrinkage. If we could only have a research committee and summarize the possible forces and eliminate the impossible.

The gold inlay is not a new subject, but there have been many different processes for making them, as the late Dr. Ames taught us how to make them in 1893. There were many discussions in those days as to the usefulness and durability, and in 1903, at the Illinois State Dental Society meeting, when the discussion of inlays, both gold and porcelain, were at their highest interest, the late G. V. Black arose and said "There never has been and is not today an inlay or any process of filling a tooth that is any better than the old pounded in gold filling for the preservation of the teeth," and I think that Dr. Johnson believes that is true today.

Many of us know that the border between the gold and tooth is the most impenetrable that we can get when the gold is properly condensed. Today we have no one process that is a greater benefactor to the profession and to humanity than the gold inlay.

In the early days of casting, we used a 20 carat gold: First, because it melted easier; second, because it cast easier, because the globular molecule affinity was less; in fact the lower the carat, the less the globular molecule affinity, and the higher the carat, the higher. Hence we must recognize this affinity in our casting force. The higher the carat, the more force is necessary to overcome the affinity, and the lower the carat, the less the force necessary.

Here is what happened with the 20 carat gold, and I anticipate it will happen with all the harder golds. After a few years, we will have the inlay standing away up, the tooth surface abraded down, due to the difference in mechanical abrasion of the occluding surfaces.

I think the nearest to the tooth in this respect is the old pounded in gold filling as Dr. Johnson has just described or that mechanically tempered surface. It seems to mechanically abrade the same as the tooth.

One other point Dr. Clappison spoke about and that is we must have a porous mold. Let us note how the sand molder gets this by taking a wire and punching little holes through the upper half of his mold, so when the molten metal runs in the mold, the air escapes through these holes.

Now the same can be done in gold castings by taking a piece of (Angles) regulating wire and heating one end and inserting it into the wax pattern at the point where the gold will force the air into, when inverting, let this wire run up along the outer side of your inverting ring, and when you pull out your sprue, pull out the wire and when you force your gold in through the sprue hole the air will escape through this wire hole.

James H. Prothero, Chicago, Illinois: One point was mentioned by Dr. Clappison and repeated by Dr. Johnson and that is the method of setting inlays. I think many overlook the physics involved there. It is a matter of physics with the central portion located in the centre and it seems a thousand miles to the margin of the cavity. That means that the cement is sometimes thin and sometimes thick and many of you try to force that excess cement out with a steel mallet or some other way. It is not possible to force it out that way. When I was a little fellow and we used to have taffy pulls, it used to be a joke to have someone hold a ball of taffy and have someone else strike that ball of taffy with a hammer. It would feel just like hitting a stone, because the taffy would not yield to the heavy impact, and yet one could press his knuckle right into the taffy. It is just the same effect

in using the mallet in the filling—it will not force it out. It is not the right kind of force. It requires heavy, steady, continuous pressure and not too much force to get rid of it. There is not much space between the walls of the inlay and the walls of the cavity. When there is no cement in there and the walls of the cement are not there you have then the thinnest possible quantity of cement between the walls of the cavity and the inlay. You cannot drive it out by heavy force, it must be done with steady pressure.

Victor T. Nylander, Chicago, Illinois: It is essential to finish the cavity to the finest detail so that the pattern will be perfectly free, with definite margins and no binding. A mistake is often made by using a crosscut fissure bur in finishing a cavity, thus leaving rough and rounded cavosurface angles. A single cut fissure, or taper finishing bur, or a fine stone of the same shape is far more efficient for this purpose.

The investment is a mechanical mixture and frequently in shipping it long distances the silex will sink to the bottom of the can, due to the difference in specific gravity and properties of the ingredients. The investment will then not respond uniformly in mixing nor to heat. By remixing the preparation prior to using it the results are apt to be more uniform.

Letting the pattern stand too long before investing or after investing before burning out the wax tends to weaken the sharp margins and renders it liable to slight distortion. The restoration should therefore be brought to completion as quickly as possible after the cavity has been made.

Dr. Clappison (Closing): Dr. Blackwell spoke of the cavity preparation. In speaking of cavity preparation I feel that this is not on my programme—flat seats and steps for resistance and retention are essential. When I received the invitation from the Programme Committee I was told very plainly to stick to the technic of gold inlays, and I did not consider that it was essential for me to consider the preparation.

In the thick-necked tooth, after obtaining sufficient separation, this is a good suggestion. I wish someone would suggest some quick means of securing a little more separation. I find that very difficult. Technic models for experimentation, I think, is the one essential for good inlay workers—getting into the laboratory and seeing what one can do.

Dr. Pyper spoke of systematizing the work. That is something that would be a godsend if we could arrive at a place of agreement.

I use a stone whenever possible, plain fissure burs and stones; on the other three-fourths where discs are useful by all means use them.

Dr. Prothero spoke of setting the inlay and keeping it at a proper angle and that is very important.

—*Journal of the American Dental Association.*

## The Little Red Lane

I know the road to the little red lane,  
The way you will have to go;  
Thru two red gates and a picket fence  
That is built in a double row.

Now to keep the road in perfect shape,  
And the valley way down below,  
The picket fence and the little gates,  
Must be perfectly clean, I know.

Your lips are the gates, your teeth the fence,  
And your throat is the little red lane,  
And your tonsils dwell in the valley below.  
Now isn't that very plain?

—*Juvenile Jingles.*

# Fixed and Removable Bridgework

BY I. H. ANTE, D.D.S., TORONTO.

(Continued from July issue).

## CONSTRUCTING POSTERIOR ABUTMENTS.

**I**NLAYs which involve cusps should be made by the indirect method, in order to avoid distortion and insure a proper fit, but the direct method may be used with success for simple cavities, proximo-occlusal, etc.

This essay is intended to demonstrate a simple way of making wax patterns by the indirect method.

After the tooth has been prepared as suggested in the July issue, with any modifications to meet the particular case, a 36 gauge copper band is chosen, of a size at least 2 mm. larger all around the tooth to allow for a sufficient thickness of wax. The band is then trimmed to the gingival contour, also free of occlusion and contact points. A V-shaped cut is made on the buccal side of the band in the gingival third so that the wax may be trimmed away from the buccal surface of the tooth.

The wax is then heated to a uniform consistency, but not to a degree too much above the body temperature, placed inside the band and carried to the tooth. The wax is carried ahead of the band at first with even pressure, then the band is pressed upwards to cut away any excess at the gingival, and also to press it closely against the gingival margin. The wax is then cut away from the outside of the band in the proximal spaces, and lingual surface, also from the V-shaped space on the buccal.

The patient is then instructed to bite and chew on the wax, which if found too hard may be softened with warm air directed on the wax by a heated chip blower or warm water from a water syringe.

This gives us an impression with the proper occlusion and articulation.

The wax is then chilled under pressure with room temperature water while the patient's jaws are closed. The impression may then be removed from the tooth by gently teasing it downward with any pointed instrument, and examined to see that it is accurate and covers all margins properly.

All of the impression must be on the middle of the band, so that we may trim all excess wax from the outside of the band. We next make a paper boxing for the impression by cutting the flap of an envelope, wrapping this around the band and sealing it.

Smear the inside of the impression (cotton and pliers or camel's hair brush) with cocoa butter which has been warmed and softened,

or oil, and a model is made with Smith's Model Cement. This cement is mixed in the same manner and proportion as crown and bridge cement when setting a bridge. The cement is introduced into the impression by placing a small amount in the impression at first with a small plastic instrument, so that there will be no possibility of bubbles. Then when the impression is filled, wet the thumb and press the cement firmly down.

The cement hardens in from 15 minutes to 20 minutes, and the whole impression and band may easily be removed by placing in warm water for a minute. The wax must not be melted, as the occlusal markings will then be lost.

Replace the band and wax impression on the model, and with a pair of shears or any sharp instrument cut the band on the buccal surface and remove by peeling it off. The wax pattern impression is then carved to proper anatomical form, with attention to the markings made by the opposing teeth on the occlusal surface. The instruments recommended for carving are any to which the operator is most accustomed, or any of the following: Ward's No. 1, Sharp Lancet, Ebersole's, etc.

The wax pattern may then be polished with strips of China silk drawn towards and over the margins, and on the occlusal surface by wrapping the silk around the points of a pair of college pliers. Apply sprue wire of 15 gauge.

When fully polished, remove the wax pattern from the cement model and place it in water at room temperature.

It is suggested that colored glasses of different colors be used, in which to place the wax patterns, a note of which may be taken to obviate any confusion of the patterns or what particular metal is to be used for casting.

The cement model is set aside, and after the pattern is cast it may be replaced on it and swaged in a soft rubber swager if found to be necessary.

#### CONSTRUCTION OF THREE PIN SLIPPER ABUTMENT.

- Slip 1*—Secure a piece of 38 or 40 gauge pure gold large enough to cover surfaces of preparation. If necessary a tin foil pattern may first be made, and the gold cut according to pattern, but operator must see that gold is large enough to extend at least  $\frac{1}{4}$  mm. beyond edges of preparation.
- Slip 2*—Apply gold to tooth in proper position and hold in place by means of piece of China silk wrapped around tooth and held by finger and thumb of left hand on labial surface of tooth.
- Slip 3*—Burnish gold to tooth through silk with suitable instruments, i.e., S.S.W. or Cleve-Dent Nos. 4, 32 and trim margins to allow slight excess of gold.
- Slip 4*—With explorer punch holes through gold to correspond with holes in preparation.

- Slip 5*—Insert elastic wire pins in holes and allow to project about 2 or 3 mms. (The gauge of wire will depend upon the size of tooth. 18 gauge for molars, 19 gauge for bicuspid, 20 gauge for centrals and cuspids, 21 gauge for lower incisors.)
- Slip 6*—Soften small ball of sticky wax and hold against lingual surface with index finger and chill.
- Slip 7*—Withdraw matrix, pins and wax, and remove from finger.
- Slip 8*—Invest and solder pins to matrix.
- Slip 9*—Trim pins so as not to project through finished wax pattern.
- Slip 10*—Return to tooth and reburnish.
- Slip 11*—Add wax to matrix and carve up to approximate form.
- Slip 12*—Place upon tooth and hold in place with China silk, then warm the wax and have patient bite and chew upon the wax. Remove and carve up to proper anatomical form; polish wax with silk; remove, invest and cast.
- Slip 13*—If gold does not cast to extreme feather edge, burnish on tooth, then flow 22k. solder over places showing deficiency, and use more pressure on the next one you cast.
- Slip 14*—Carry back to tooth, burnish and trim edges with disks and stones to proper adaptation and to suit occlusion.

(This method may be employed in the construction of any of the anterior abutment preparations. For reasons of color platinum may be employed for the matrix instead of the gold.)

#### CASTING THE ABUTMENT.

1. Cavity should be properly prepared free from undercuts and saliva.
2. Proper inlay wax heated slightly over body temperature and inserted into the cavity under pressure.
3. Wax chilled while under slight pressure with room temperature water.
4. Wax carved to proper anatomical form and removed from cavity without distortion.
5. Insert sprue, the larger, shorter, and the greater number the better.
6. Retain wax model in room temperature water.
7. Use an investment with a high plaster content in proportion of 6 of plaster, 5 of fine silex and one of medium silex, for steam, air or centrifugal pressure.
8. Mix investment with room temperature water in proportion of 2 of investment to 1 of water (spoons full).
9. Mix investment with the least amount of agitation.
10. Apply investment so as to eliminate all air bubbles.
11. Allow investment to harden 15 or 20 minutes, then heat.
12. If allowed to stand over night place ring in shallow water.
13. Remove the sprue and sprue former carefully.
14. Heat investment for one hour (average inlay size) at 350 degrees.

15. If casting against gold boil out the wax in boiling water for 3 minutes before heating at 350 degrees.
  16. If casting against gold as backings, etc., cast when hot.
  17. If pins or posts are employed cast when warm (not hot).
  18. For ordinary inlays, three-quarter crowns, etc., cast when just able to handle ring comfortably.
  19. Use any machine for casting that you desire, but first learn the details for casting with that particular machine.
  20. Safest to use an illuminating gas flame unless you are an expert with others (oxygen, Prestolite, etc.).
  21. Use 21 times the weight of the wax in gold or two-thirds in the inlay and one-third excess.
  22. Always add new gold to the cleaned excess button.
  23. Heat all casting golds up slowly with gas flame 3 inches long and just enough air to remove carbon flame.
  24. Cast the gold just as soon as it comes to spherical form and the surface clears itself.
  25. Allow to cool down gradually then wash in water and boil in acid (hydrochloric).
  26. If inlay is warped look to overheated gold or mould.
  27. If the inlay has small bubbles of gold upon its surface, or fan-shaped excess, look to poor mix of investment, over-heated mould or gold, too much pressure.
  28. Shrinkage at union of sprue and inlay is lack of pressure or overheated gold. Save that inlay and do not overheat the gold.
- 

THE BUSINESS SIDE OF DENTAL PRACTICE.—Most of you have probably read Dr. Clapp's book on "Profitable Practice," and you will remember his proposition that a dentist putting in 2,000 working hours a year only has 1,000 income hours. It is a startling proposition, and few of you will believe it. I tested the truth of the statement on my own work five years ago, and found it only too true, and I suggest you test it for yourself, and to-morrow begin, with paper and pencil, to carefully record the time you take to the technical work, the time taken up with interruptions—no matter what they are; the time lost between dismissing a patient and getting the surgery ready for the next, the time taken in making appointments, in answering telephone calls, and all the likely absorbers of your valuable time. To clearly understand the significance of Dr. Clapp's statement, let me state it in shorter periods. If you work 8 hours a day, 4 hours are lost; each week, out of 44 working hours, 22 are lost, or nearly 3 working days of 8 hours each week, 156 days in the year, or over 5 months in the year.—T. W. DAVIE, L.D.S., *Dental Record*.

# THE COMPENDIUM

This Department is Edited by  
THOMAS COWLING, B.A., D.D.S., Toronto

A SYNOPSIS OF CURRENT LITERATURE RELATING  
TO THE SCIENCE AND PRACTICE OF DENTISTRY

## QUARTZ LAMP THERAPY IN ORAL CONDITIONS.

**L**OUIS B. LIPPMAN, D.D.S., of the Mount Sinai Hospital, gives an account of the use of the quartz lamp for dental treatments, in a paper published in the International Journal of Orthodontia.

The quartz lamp produces a powerful violet light, rich in ultra-violet rays. This light is being used by physicians with marked success, especially in the treatment of skin diseases and chronic suppurating conditions. Various cases ranging from simple gingivitis to morbid pyorrhea, were treated with the quartz lamp and in those cases where much loss of process existed no marked change was noted in the firmness of the teeth but in all cases the purulent discharge was stopped and the gums resumed a healthy tone. Bacteriologic examination exposed the presence of Vincent's bacilli, which proved negative after the fifth treatment in the less severe cases, and after the tenth in the worst.

When first used, the treatment consisted of a one-minute exposure, and increased daily by one minute for four days, after which five-minute exposures were made. This light has been applied in cases other than pyorrhea, such as Vincent's Angina, cellulitis, periostitis, neuralgia, post-operative pains, and in all post-operative procedure about the mouth, with most gratifying results.

Treatment must be intensive while it lasts. Unfortunately, no definite law can be made for the length of the exposure. People of light complexion will react more readily than those who are dark. It is best to start with short exposures and work up to longer ones.

The penetration of the rays is dependent on the following factors: distance at which the applicator is held from the point of application, current strength, and length of exposure. Where deep penetration is desired, as in pyorrhea, abscess conditions, periostitis, etc., the applicator is brought into contact with the tissues under pressure, causing dehematization, and treatment is begun with a two or three minute exposure, and each successive treatment is increased by two or three minutes until five or eight minutes are given. In exposing open wounds in the mouth to the rays, the applicator is held from one-half to one inch from the wound, and treatment may be begun with three or four-minute exposures and be gradually increased up to ten minutes.

The moist mucous membrane will stand a greater exposure than the skin. Therefore, when the rays are applied externally, the applicator is held from three to four inches from the skin, and two to four-minute exposures are usually sufficient.

Reaction occurs within about five hours after exposure, and manifests itself in a slight reddening of the skin, growing more tan with each successive exposure, simulating a sunburn. After treatment is stopped the skin will peel and gradually reassume its normal color.

Too great an exposure may result in severe reactions and form vesicles on the mucous membrane or a painful burn on the skin. The pain and discomfort are temporary and usually disappear in two or three days. If a burn occurs, treatment should be stopped until the burn is healed, and then resumed with shorter exposures. Coating the burn with vaseline will hasten recovery.

The claims advanced for ultra-violet ray therapy in the treatment of oral conditions are: It is germicidal in action; it stimulates cell-activity, thereby promoting phagocytosis and the processes of metabolism; it exerts an oxidizing action on the blood; it eliminates to a great extent the use of chemicals which, beside being germicidal, are also cytotoxic; it produces an analgesic effect on terminal nerve fibres; its proper application involves no pain or discomfort for the patient.

#### DETECTION OF UNERUPTED HUTCHINSONIAN TEETH BY X-RAYS.

THE "Lancet" briefly comments upon the report of Messrs. J. H. Stokes and Boyd Gardner as published in the Journal of the American Medical Association as follows:

"The presence of Hutchinsonian teeth in congenital syphilis has long been recognized as a valuable diagnostic sign, although their absence by no means precludes the diagnosis of syphilis. It frequently happens that when the teeth are affected so many other signs are present that the diagnosis is beyond doubt, but, when the diagnosis is not easy to make, it becomes important to discover every sign which may point to congenital syphilis. The upper central incisors, which are the typical teeth affected, do not erupt until the age of seven, so that ordinary clinical examination cannot give information on this point before that age. However, the shape of these teeth can be determined by radiograph before their eruption. The upper incisors begin to calcify during the first year of life and the crowns are complete at about three and a half years; thus, from the age of three sufficient of the crown has been formed to demonstrate the peculiar shape of these teeth in congenital syphilis. It must be remembered that only a minority of children with congenital syphilis present Hutchinsonian teeth, but on the other hand, there are cases in which the dental stigma may be chief, or, indeed, the only distinct sign present. Radiography is now generally available, while an intraoral film is not difficult to take, even in a child, so that this method of ascertaining the shape of the unerupted incisors should prove useful in doubtful cases."



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### BRITISH COLUMBIA

THE annual meeting of the British Columbia Dental Association was held in Vancouver during the week of July 3 to 7. It was in the form of a Post-Graduate meeting, Dr. James Mark Prime, of Omaha, conducting a class on Tooth Form, and indirect inlay construction. During the first two days, the work was devoted to Tooth Form, the members of the class being required to carve teeth out of plaster to establish the underlying principles of form and function. The balance of the time was devoted to indirect inlay construction, the whole technique of cavity preparation, impression taking, amalgam dies, wax carving, casting and final swaging being taken up by members of the class. In addition, Dr. Prime interpolated a number of lectures, his talk on "The Physiological Function of Tooth Form," being a feature.

An interesting banquet was held during the meeting at the Elyseum Hotel, an exceptionally good program by local entertainers having been arranged by Dr. W. S. Watson, this being followed by a series of impromptu toasts, Dr. A. T. Oberg acting as master of ceremonies for the evening.

The Vancouver Dental Society decided to hold its annual picnic in connection with the meeting, Saturday, July 7, being devoted to this purpose. A large yacht was secured upon which a whole day trip to Gambier Island was taken. In addition to two picnic meals served at the island and on the boat, a number of athletic competitions were held, the principal event being a baseball game between the men inside of the Birk's building, and those outside, the outsiders winning by a large score. The executive of the Vancouver Dental Society are to be complimented upon the thoroughness of their arrangements.

At the annual meeting of the Association, the following officers were elected for the coming session: President, Dr. W. S. Watson, Vancouver; First Vice-President, Dr. A. J. Garesche, Victoria; Second Vice-President, Dr. T. R. Peden, Vancouver; Secretary,

Dr. Ralph W. Hall, Vancouver (re-elected); Treasurer, Dr. T. J. Muir, Vancouver.

Interest locally is already being taken in the coming biennial meeting of the Canadian Dental Association, to be held in Vancouver next summer. The British Columbia men are fully alive to the size and importance of this meeting, which will be held in conjunction with the meeting of their own association. Dr. W. J. Bruce, Chairman of the executive committee is now in eastern Canada, and is getting in touch with the other officers and committees, and active plans for the details of the meeting will be started immediately upon his return to Vancouver.

Situated in a climate where golf can be played throughout the whole year, it would be strange if the men did not take an active interest in this sport. At a meeting held early this season a Vancouver Dental Golf Club was formed, with the following executive: President, Dr. G. A. McGuire; Vice-President, Dr. Oliver Leslie; Secretary-Treasurer, Dr. J. S. Bricker. The club plays regularly on alternate Thursday afternoons, and a number of interesting competitions are in progress. The Ash-Temple Cup was won this year by Dr. P. E. Margeson, of Nanaimo.

A. T. O.

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### MARITIME PROVINCES.

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#### REPORT OF DR. F. W. RYAN, ACTING DEAN OF DALHOUSIE DENTAL COLLEGE TO THE NOVA SCOTIA DENTAL ASSO- CIATION, HALIFAX, JULY 24TH, 1923.

**M**R. President and Gentlemen:—On behalf of the Faculty of Dentistry, I would report that the Dental College has experienced another very successful year. There were in all, sixty-eight students in attendance, which taxed to the full the facilities of our departments and equipment and entailed assiduous attention on the part of our staff of instructors.

A helpful spirit of co-operative endeavor characterized the relations of staff and students. While we regret that all students did not reach the desired goal of the year, we believe their failure was not accompanied by any feeling of resentment towards their lecturers.

It has never been claimed that the course at Dalhousie is easy. Its demands upon the student are fairly exacting; but quite within the reach of the average student, if he chooses to make the necessary effort and give it the necessary attention and application.

We heard it expressed in the Legislature last winter that Dalhousie students are never turned down by the Board of Examiners. Perhaps it would be interesting in this connection to review the history of the class which graduated this spring. This class numbered thirty students, beginning their dental course in the session of 1919-20. At

the end of the first year 8 students were found short of the standard so that in the second year, 1920-21, there were 22 in attendance. In the next year, 1921-22, five more were missing, leaving but 17 students in the class. In the last session one of these was debarred, leaving but 16 of the original 30 in the final year. A student of a former class, who had lost a year, joined this class for the final year, thus making 17 graduates. It will thus be seen that nearly 50 per cent. of this class failed to reach the goal.

It was surely a commendable effort on the part of this Association to endeavor to add to the other educational institutions of the Province a school, wherein the youth of our land might obtain, if they so desired, satisfactory instruction in the principles and practice of this highly technical specialty, to which we here assembled owe allegiance, and which we believe has so great an influence upon the health, happiness and well being of our fellows.

There can be no question that the school has been a potent factor in the professional development of our profession, and in the enlightened opinion regarding it. But while it has served to accentuate the conviction that Dentistry is an important agent in the service of health, it has also been used by innuendo to serve the ends of those who desire to profit by such protection as the law provides, but who for sundry reasons are averse to attaining the standard of professional efficiency which those laws demand, resulting as you are aware in a change of the law, by which, for a time at least, the standard of professional qualification for registration in this Province was very materially lowered.

While this incident is to be regretted in that it admits to the ranks of legally registered dentists men who had hitherto not complied with the required standard, it is perhaps more to be regretted in that it indicates on the part of the legislators of this Province a lack of appreciation of the effort being made to maintain a place in the ranks of those progressive communities that are pressing forward toward the realization of the conception that the health of the people is a public trust, that the subject of education in matters that affect the health of the people, is not a matter of private enterprise or commercial exploitation.

The day of the commercialized professional school, organized to make money by charging students more than it costs to educate them, is gone, and is supplanted by the idea that it is the duty of the school to give more than it takes from the student.

We were fortunate in having the administration of our school taken over by the University, as soon as the need of such an institution was made apparent. It is difficult to see how the financial problems could have been solved otherwise. The income from the fees of a dental student today, does not nearly meet the cost of his education. The extra revenue is derived from Government grants or subsidies, from en-

dowments from public spirited citizens or other philanthropic benefactions.

There are three vitally concerned parties in the education of the dentist: The first party, the Student, pays partly in money, largely in time and application to prepare himself for his life's work, and he is entitled to the rewards which should follow the application of his skill and knowledge to the service of humanity.

The second party, the public, pays and is entitled to receive the reward of its investments, viz., the services of well-informed, highly trained and skilful servants.

These two parties on the one hand contract with the third party, the college, to produce, in lieu of the above mentioned considerations, a well informed, highly trained, cultured professional servant to perform certain services of which humanity stands in need. It is therefore the duty of the college, not only to produce such a project, but to reject such material as does not measure up, or give promise of measuring up to the required standard of the product.

We have perhaps to be pleased with the measure of success that has attended our efforts, for the recognition our school has received and the position it has won among similar institutions on this continent.

We realize, of course, that we are greatly handicapped. As yet no public recognition has been vouchsafed to us in the way of grants or endowments. The University is doing what it can for us out of its meagre resources, that is, meagre in comparison with the demands upon it, and the staff is contributing its time and labor with inadequate remuneration.

The Medical Faculty has received a vitalizing impulse through the Carnegie-Rockefeller endowments; but no such windfall has dropped to us. Nevertheless, notwithstanding the failure of the public to assist us financially, we are carrying on and doing the best we can. Each year sees additional equipment and facilities for imparting instruction, in the way of charts, models, technic appliances. We are encouraged by the attitude of our students, by the approbation of the Carnegie Commission of experts, and by their assurance that we have started right, that our standards are just, our aims high, our motives pure. And if, as we believe, the reward of honest effort is sure, then if we of the Association will stand behind our School, be loyal to it and take council together, in its interest, we may look forward with confidence to the fruition of our hopes concerning it.

\* \* \* \* \*

THE Annual Meeting of the Nova Scotia Dental Association was held in the Munroe Room of Dalhousie Dental College on July 23, 24, 25. There was a splendid attendance, especially of men from other centres in the Province.

The following officers were elected for the next year:

President, Dr. G. N. Stults, Halifax.

1st Vice-Pres., Dr. J. T. Lebetter, Sydney, C.B.

2nd Vice-Pres., Dr. G. B. Richmond, Sydney, C.B.

Secretary, Dr. J. Stanley Bagnall, Halifax, N.S.

To complete executive, Dr. W. W. Woodbury, Halifax, N.S.

The first session of the meeting, on Tuesday, July 23rd, was devoted to business. Dr. G. K. Thomson, who has been the Sec.-Registrar of the Provincial Dental Board for the past twenty-five years handed in his resignation at this meeting. The following resolution in appreciation of his services was passed by the Association:

"Resolved, that the Nova Scotia Dental Association, on the occasion of the resignation of Dr. G. K. Thomson, as Secretary-Registrar, hereby expresses its deep appreciation to Dr. Thomson for the long and faithful record of service to the Association and to the cause of Dental Education in Nova Scotia.

"The Association wishes to express its gratitude to Dr. Thomson, for not only fulfilling the onerous duties attached to that office, during a period of twenty-five years, but in addition for his constant readiness to devote on all occasions, of his time and energy to any project of the Association making for the advance of general dental knowledge throughout the community, for the improvement of dental education and the development of dental legislation."

The second session was a clinic by Dr. I. H. Ante, of Toronto, on the Hall method of Impressions for Full Cases. Dr. Ante gave a practical demonstration on a full upper and lower case.

Third Session opened on Wednesday morning. First clinic was the extraction of a lower set, under Conduction Anaesthesia, by Dr. G. R. Hennigar, Halifax.

Clinic by Dr. G. K. Thomson, Halifax, on Preventive Dentistry, particularly stressing the role of traumatic occlusion.

Clinic by Dr. W. W. Woodbury, Halifax, demonstrating methods of treatment on several cases.

Fourth Session. Clinic by Dr. Ante on Crown Bridge and Inlay Work, he considered especially a number of types of inlays used as abutments, especially the Three-Pin Slipper, Carmichael and other types of Veneer Attachments, and M.O., D.O. and M.O.D. Inlays.

Fifth Session. Clinic by Dr. Ante on Root Preparation for Dowel Crowns, the Inlay Crown and Design of Partial Dentures.

A banquet was held in the Halifax Hotel on Wednesday evening. Dr. W. H. H. Beckwith and his friends arranged for the musical part of the programme. The Association can always be sure of something good when Dr. Beckwith arranges for the music, but this time, — well, you should have been there.

Dr. Ante and Dr. H. S. Thomson both gave short talks, the latter struck a particularly happy note when he made a plea for co-operation.

He asked for greater co-operation, not only between dentists, but also between dentists and physicians.

After the banquet the members were the guests of the Royal Nova Scotia Yacht Squadron at a dance and play.

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The annual meeting of the N. B. Dental Society was held in Moncton on July 17-18. There was a business meeting, and three clinics by Dr. Ante.

Dr. C. F. Purdy has opened an office in Moncton.

\* \* \* \* \*

The Red Cross Travelling Medical and Dental Clinic has just completed a six weeks' trip through Halifax County. Following are a few interesting extracts from the published report of the work of the clinic:

"Before the caravan set house the county health nurse travelled through all various districts and made a survey of the medical and dental work needed and arranged for the holding of the clinics.

"They gave moving picture and health talks on 22 evenings, sold 229 tooth brushes at cost, gave 779 dental treatments, 2,277 extractions, 1,493 prophylactic treatments and 251 fillings.

"One little boy who attended the clinic was quite willing to have the necessary teeth out if he could have gasoline first to take away the pain."

J. S. B.

### The Mirror Baby

What did Baby sister spy  
In a mirror wide and high?  
Why, a little girl inside,  
With big blue eyes open wide.

Pearly teeth in two wee rows  
And a cunning little nose,  
Dimples on each rosy cheek,  
Brown curls 'round her ears that peep.

Baby laughs out loud with glee  
Just as merry as can be,  
And the other baby, too,  
Laughs back: mirror babies do.

Laugh and laugh, for that's the game,  
Other baby does the same;  
But should baby sister frown,  
Mirror Baby's smile is gone.

—*Juvenile Jingles.*



## A Bunch of Keys

I NEVER look at a bunch of keys without being impressed with the terrible arraignment it represents of our so-called civilization.

What a commentary it is in our ethical status that we are obliged to lock our homes, our barns, our garages, our offices, our business houses, our trunks, our hand-bags, our automobiles, and that we must further secure in thick iron safes any valuables that we may possess. Is it not a constant acknowledgment of the collapse of our moral standards when we thus have to protect ourselves against our fellow man? Have we advanced no higher than the beasts who steal from each other? Or, rather, have we not descended lower than the beasts, when we use artifice and ingenuity which they could never dream of to filch from a fellow creature? If we have gained in some respects over the beasts who devour each other for food, we have lost immeasurably in others, when we fail to play the game fairly and squarely in our dealings with each other.

It is depressing to think how far we have descended, how very low we have fallen. And then the apparent hopelessness of our position—we seem to be growing worse instead of better. Think of all the ingenuity that is being used to-day to devise locks, and safes, and combinations to prevent stealing. And think of the ingenuity employed to circumvent the plans of the locksmiths and safe-makers—how really wonderful are some of the methods of the safe-breakers, and how very industrious and persistent are they in carrying them out. It is wit pitted against wit, with the most horrible waste of human energy and resourcefulness at the end of it.

What is the remedy? Apparently not jails and prisons. We have many of those and they are discouragingly filled with offenders of all sorts. Possibly the law against stealing may have a deterrent effect on thieving—possibly without this law men (and women) might steal more than they do; but the law apparently does not get at the foundation of the trouble—it has never prevented stealing so far, and it has been in operation for ages.

What then? I wish I had a rock-ribbed remedy that would

never fail, but I find I am human and have no panacea. One thing we can do—we can develop a stronger sentiment than we have against the petty thieving that seems to be going on everywhere. We can frown upon it and make it appear more of a disgrace to be caught stealing, more of a reflection, more of a sin. It is no trifling matter to take something—however small—that does not belong to you. It is fundamentally wrong, and should be so considered.

I was much impressed on hearing of a community at one time where stealing was unknown. There was a mental attitude in that neighborhood which appealed to me, and it was illustrated by an incident which occurred on the occasion of a new-comer moving into the community. As is usual with most people nowadays he locked his buildings at night, and as soon as this became known a committee of the neighbors called on him to ask why he did this. They resented the implication at once that there was anyone in that vicinity that would steal. They construed his act into a reflection on their honesty, and he was forced to leave his locks off his buildings. That is the sentiment that should be made to prevail in every community.

Here is a problem for humanity to solve. It is no trifling matter, this tendency to thieving. It is morally disintegrating, and the world would be a better place in which to live if every man, woman, and child could be brought to view this question in its proper light. Of course, the argument might be carried further, and the larger crimes of huge grafting and stock manipulation included in the category, but what I am considering now is the common, everyday "lifting" of things which do not belong to the lifter. And this is the thing which constantly confronts me whenever I put my hand in my pocket and feel a bunch of keys. I blush for humanity when I think of those keys.

*C. H. Johnson*

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#### AN EXPERIMENT IN PREVENTIVE MEDICINE.

THE "Dental Record" reports that Sir Philip Sassoon, who has acted as private secretary, first with Lord French, then with Earl Haig, and recently with Mr. Lloyd George, has established an adult dental clinic at Folkestone. The main object of this is to carry on the work of the school dental clinic after children have finished their schooling. The clinic is held on the premises of the School Medical Department, and the school dentist is in charge. The scale of fees is very low, but only persons unable to afford visits to private dentists are allowed to attend for treatment. This experiment of Sir Philip Sassoon is being watched with interest, for it is probable that in the near future public organization of dental services will become part of the National Health Insurance scheme.

# ORAL HEALTH

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No. 8

## EDITORIAL

### The Status of Dentistry

THE only way to raise the status of the dental profession is to raise the status of the individual member. That is dentistry's problem to-day. Dental educators have been thinking of dental standards mostly in terms of the young graduate. There has been an unfortunate tendency of recent years for dental teaching bodies to devote the greater part of their energies to the undergraduate course, in the hope that the graduation each year of a group of young dentists, well trained in the science and practice of their profession, would act as beneficent leaven and spread an influence throughout the entire profession. But in practice this much-desired result has not been attained. The young graduates have gone out into the dental world, and while their influence has undoubtedly been felt in many localities, in many other districts the much larger group of older practitioners has so outnumbered the younger men that they have felt diffident, and their opportunity for service to the dental profession has been greatly minimized or entirely lost.

A new era in dentistry will be ushered in by the general adoption of entrance requirements of equal standard to those of medicine.

This has already been done, or will be done, by many dental schools within the next few years.

But what of the status of the dental profession as a whole? This surely can only be raised through the united effort of dental teaching bodies throughout the country to develop and encourage graduate work. Extension lectures, post-graduate classes, library facilities made available to practitioners, special short lecture and clinic courses—all these and many other plans must be put into effect by the dental schools, if the graduates in dentistry of five, ten, or more years' standing are to receive their due.

A dental license, once granted, does not imply that the holder is for the rest of his life efficient in the practice of dentistry. The graduate himself fully realizes the situation, and his one desire is to obtain necessary post-graduate instruction without too great a loss of time or too great an expense. It is clearly the duty of the dental schools to place the more recent advances in dentistry within the grasp of the busy practitioner. Public health and public interest demand it.

This is the only way to raise the status of dentistry to the point where it is a scientific health service and not merely a highly-developed mechanical art.

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## The Cleveland Meeting

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CANADIANS appreciate the kindly courtesies that, year after year, are extended to them by their professional brethren of the United States of America, and particularly during the conventions of the American Dental Association. Canadians have been received most generously as guests of the A.D.A., and in turn the Canadians have received members of the American Dental Association as guests at the meetings of the Canadian Dental Association. May this happy spirit of fraternalism long continue.

The American meeting this year will be held in the beautiful city of Cleveland. The programme is exceptionally worthy, and Canadians have been graciously invited to be present. Let us show our appreciation by going to Cleveland, September 10th to 14th, 1923. The tentative programme of the meeting is available to those who may be interested, it having been published in full in the July issue of the Journal of the American Dental Association. LET'S GO!

*A good man is one who still seems  
that way after you know him better.*



E. A. GRANT, D.D.S., TORONTO,  
*Secretary, Canadian Dental Association, and Director of  
Dental Services Department of Public Health, Toronto*

# ORAL HEALTH

A JOURNAL THAT STANDS FOR THE "OUNCE OF  
PREVENTION," AS WELL AS THE "POUND OF CURE"

Vol. 13

TORONTO, SEPTEMBER, 1923

No. 9

## Symposium of Articles Prepared by Officers of the Dental Corps, United States Navy, and of Practical Interest to the Dental Profession

### MANIPULATION OF AMALGAM.

BY H. E. HARVEY, LIEUTENANT COMMANDER, DENTAL CORPS,  
UNITED STATES NAVY.

THE subject of the manipulation of amalgam is one which is of the utmost importance to the general practitioner, and it may be interesting to know that competent authorities assign relative values to the metal filling materials in common use as follows: First gold foil, second amalgam, and third gold inlays. There are places, of course, where inlays are indicated on account of factors which will readily present themselves to the mind, but the above is the result of observation and thought by careful technicians who are qualified to judge and whose judgment must be given consideration.

In common with most any material, amalgam restorations may be a menace to the integrity of the tooth, provided a knowledge of its properties are not borne in mind and the principles of its manipulation are not mastered. It may seem to the uninitiated that nothing could be simpler than the incorporation of mercury with the alloy as furnished by the manufacturers and the placing of the resultant mass in the cavity. Nothing original is claimed in the presentation of the subject herein, but familiarity often leads to contempt, and so daily manipulation of materials without an occasional check up may lead one into changes in technic which may very materially affect results.

Fortunately for the profession, manufacturers supply alloys which conform to the scientific requirements set forth in 1895 by Dr. G. V.

Black, when he gave to the profession the theory of the "balanced alloy." His work explained the reasons for the lack of uniformity of results which would be obtained under the same conditions with alloys of exactly the same percentage formulae at different times. In fact, his researches have removed the stigma formerly attached to amalgam restorations, and to-day under proper manipulation it proves in many cases the ideal material. He showed how to balance the composite metals of the alloy by counteracting the expansion of one by the contraction of another, how to control the flow, and by annealing to artificially age it so that the setting could be controlled. The second volume of his *Operative Dentistry* contains his experiments and the conclusions reached, which will not be dealt with here in detail.

Zinc is regarded by some as a factor in alloys which cannot be definitely controlled, but it is significant that a small percentage of this metal is contained in those which enjoy the highest of reputations and which in unbiased scientific tests have proven to fulfill the most exacting requirements.

A few words on the properties of the elements which compose alloys may help to an understanding of the technic of manipulation and insertion. Silver contributes expansion and strength; tin contributes contraction and easy working; copper contributes unchangeability and strength; zinc contributes toughness. The last three may well be considered as modifiers for the silver and, being base metals, as necessary evils. The properties of silver are such as to render it unsuitable for the purpose without modification.

Mercury has a decided affinity for tin, almost similar to that of blotting paper for water, while its affinity for silver, copper and zinc is so much less that upon adding mercury to a mixture of these metals it at once unites with the tin and will incorporate with the remaining metals only with difficulty. Here we reach the first most important step in the proper manipulation—that of *forcible* trituration in the mortar. An important addition to the dental cabinet is a three-minute sand glass. After the mercury is added to the filings in the mortar, the glass is inverted and forcible trituration is made for one minute and a half, or until half of the sand has run through the glass; a psychic factor, perhaps, is that with the end of the time in sight, more forcible pressure will be exerted on the pestle and a more thorough incorporation of the metals effected. This cannot be neglected when the fact is borne in mind that the mercury has a decided affinity for the tin and much less for the other metals present. The result to be desired is that during a minute and a half the mercury be made to unite with all the particles of the silver, copper, and zinc as well as with the tin.

We hear of weighing the proportions of alloy and mercury, but

by experience it has been found that this is not essential; an excess of mercury is necessary, but in this reason must be used. The alloy will take up only so much mercury, the remainder being present to form in excess a sloppy mass. Excess mercury is removed by pressure, and the point has here been made that in expressing it the balance of the alloy may be disturbed, and this in fact is a possibility if a thorough incorporation of all metals present has not been made. For instance, with weak-kneed trituration the mercury may have united with all of the tin and only a portion of the other metals, and logically an expression of the excess from such a mix would be expected to disturb the balance. However, if a proper mix is made, experiments have shown that the metals have been removed in practically the same proportions as they exist in the alloy. All this, however, is not to the effect that more mercury should be added than is required to make a uniformly easily plastic mass without evidence of sloppiness. Mercury is added as desired to produce a mass which presents a highly polished, smooth, lustrous surface, which sticks to the mortar as trituration proceeds and just falls away from the sides of the mortar a little as it is jarred. After a minute and a half the plastic mass is transferred to the palm of the hand and mulled, not rolled, with the thumb of the other hand; that is, it is pressed out with a pulling motion to flatness, and this is continued to further incorporate the metals until crepitus is felt. If the proportions of alloy and mercury are right the mass should make a smooth mix which will take a good impression of the lines on the fingers without being sloppy; should be capable of being rolled into a long, slender roll without much breaking; and lastly should not change form when kneaded into a ball. This final mixing may be done in a rubber finger stall or otherwise as desired.

At this place may a simile be given? When it is desired to work metals they are heated to fluidity with a blowpipe, and if it is desired to retain this molten state it is necessary to keep the heat of the flame on the metals. For the sake of comparison, the mercury may be considered as the blowpipe which is keeping the metals molten; and as half of the mix is to be kept plastic to complete the last portion of the filling, the mass is divided into equal parts, and to one is added a little more mercury; this is mulled and laid on one side, so to speak, in the molten state. Any remaining excess is expressed between the thumb and finger from the other part and it is ready for immediate use.

The matrix having been previously adjusted, the first portion of the mass, or that which has had the excess removed, is used to make the first portion of the filling, using medium-sized pieces. If in place of this plastic mass a small piece of sponge saturated with water were placed in the cavity, what would happen when force was applied

with the face of a plugger? The water would be expressed toward the sides and would come up over the plugger point; and while the sponge would be confined under the plugger, the water would escape by the margins or over the plugger. Bearing in mind that the mass with which we are dealing has still an excess of mercury incorporated in it, the same thing will happen as we force the plugger on the amalgam placed in the cavity; the mercury will be forced away from the mass directly under the face of the plugger and toward the sides of the cavity and the margins. Now, it so happens that these are the very places in the filling which should contain a material which will set and become hard, which is not the case when amalgam contains an excess of mercury. For instance, should large, round, broad-faced pluggers be used during the packing, the force of the pressure being transmitted directly under the plugger will condense the mass there and leave it weak at the margins, it being impossible to adequately approach the margins with such a plugger. When an attempt is made to do so it results in forcing the mercury toward the places where pressure cannot be brought to bear; that is, in angles and cavity margins and sides. The ideal condition is one in which all the excess mercury is forced toward the top or open part of the cavity, and this is what is attempted. Pluggers are selected, Black's by preference, which offer a variety of suitable shapes, and from these one is taken which will most accurately fit into the angles and will, when the position is changed, entirely cover the gingival margins. With the sponge in mind we press the plugger firmly down through the mass, intent on condensing the mass directly under the face of the plugger; this pressure is made with considerable force, and as the downward pressure is completed it is held there for a momentary period to allow the mercury to escape toward the open part of the cavity. The angles, margins, and walls are successively packed down with strong, steady pressure, no tapping, and the plugger left momentarily as the material is condensed beneath it. Several pieces are added, usually the first half of the mix, which should half fill the cavity, or a little more. When this has been correctly done the entire surface of the material which is exposed to the opening of the cavity will be found to consist of a very sloppy mix, which will contain all excess mercury. This is removed with a suitable instrument, excavator or what not, until the firm material underneath is reached. A test made at this point by using great pressure on a small-faced instrument should result in no more than a dent being made in the amalgam in the cavity; in other words, the entire mass remaining in the cavity should be hard, firm, and practically free from excess mercury. As the margins and gingiva have been condensed, a slight excess of mercury may have been expelled between the matrix and the tooth, but the majority of it will escape by the surface.

After the softened surface of the filling has been removed and a hard dense mass has been reached, that portion of the original mix which was laid aside is now used in exactly the same manner, expressing between the thumb and the fingers any excess which can be so driven off. The same forceful steady strokes of the plugger down through the material are repeated until the occlusal margins are reached. The mouth of the cavity or exposed surface of the filling, as it now is, will be found to be covered with very soft filling material; this is removed and more of the original mix is added. While condensing in the cavity, the walls and matrix have served as a means of confining the pressure, but the resistance of these is lost when the occlusal surface is reached. Were the filling to be finished by merely removing the excess of softened material, we would find that the margins contained a mixture in which too much mercury was present. The material would set after a fashion, but would never become hard and dense, thus leaving the filling weak at one of its most important points and depriving the amalgam of its edge strength. To compensate for lack of retaining walls, the technic is changed a little at this point by taking the remainder of the mix and forcibly expressing in chamois skin with pliers any material which can be driven off. This mass is then divided into several pieces and is wafered on the surface of the filling; that is, a portion is flattened, placed on the filling adapted with a broad-faced plugger, and over this a large smooth instrument or burnisher is placed and the handle of this instrument tapped lightly sideways with another small instrument. This has the effect of bringing into the very dry mass on the surface of the filling any near-by mercury, which is necessarily derived from the surface and margins of the filling beneath. This is repeated a time or two and the filling is then ready for finishing. The result of the above technic is a filling of such strength that it cannot be crushed or broken with any force which the fingers can bring to bear upon it with an instrument, but, strange to say, it can be carved or trimmed without effort by using a cutting instrument.

If a filling is placed in the manner described without previous separation of the teeth, it is useless to attempt to restore contact, because the filling material cannot be burnished or pushed down after the matrix is removed; it can be carved with ease, but otherwise its form cannot be changed.

Separation, either previous or immediate, is essential in the construction of fillings with the above technic when contacts are to be restored, and without them the filling, however well inserted, must be classed a failure. The choice of selection in the matter of separation for amalgam fillings seems to be immediate separation with the Perry separators. These have a double bow and are con-

structed so that they will not slip toward the gingiva; if the teeth are short, a piece of base-plate gutta-percha should be softened and placed on the occlusal surfaces of the teeth as rest for the bows. A most valuable feature of their construction is that they are adapted to securely hold against dislodgment matrix steel which should be cut and fitted for each tooth. Details of the preparation of matrices for this purpose are set forth at length in Doctor Black's book, mentioned in the fore part of this article. Just a word here regarding the sterilization of these separators. Boiling is to be preferred, but it is questionable if this would prove satisfactory, due to the threaded portion of the appliances becoming water-logged, with subsequent rust formation. They should work easily and freely when the wrench is applied, and failure to thoroughly dry and oil the threads after each boiling would soon result in their becoming useless. Some operators doubtless discount this possibility by not sterilizing them. Saturating them with alcohol and burning it off is recommended; with a touch of oil to threads, after each sterilization, this should prevent them from binding.

Not only do the Perry separators establish and maintain separation during the operation, but they relieve strain on the periodontal fibres to a large extent by lifting the teeth slightly from the alveolus when properly adjusted. They also will tighten up on loose contacts between adjacent teeth, thus a filling may be inserted which will restore the contact of the tooth in which it is placed and maintain contacts between the adjacent teeth. Contacts are so often reduced in mature adult life through abrasion of tooth surfaces during normal mastication due to individual tooth movement; also this may occur as the result of traumatic occlusion, and, last but not least, bodily movement of adjacent teeth or drifting, as it is termed, may have resulted from the existence of the very carious area which is being cut away and filled.

The details set forth above go for naught unless a properly balanced alloy is used. Shrinkage is absolutely contra-indicated, and to avoid this alloys should be used which show an initial expansion of not more than three ten-thousandths of an inch. This slight expansion is considered advantageous, as it locks the filling in the cavity so tightly that space for bacteria to enter does not exist around the margins. The use of such an alloy when properly inserted also prevents discoloration of tooth structure, as in the past the most prolific cause of this annoying factor has been found to be an improper adaptation of the filling material to the cavity walls and margins, either through a poor operative technic or the use of a low-grade alloy. The Navy supplies a balanced Black alloy, so that one factor in a careful technic is cared for.

Dr. Thomas P. Hinman some years ago conducted a series of tests

of the manipulation of amalgam by sending to prominent dentists in different parts of the country prepared cavities and asking them to fill these with amalgam according to their usual procedure and to return them to him for tests. He failed to find a filling which was so accurately adapted to the cavity walls that it would withstand a few pounds of air pressure without leaking. The conclusions reached were that all who had inserted fillings for the tests used the amalgam too dry, or, in other words, that from which too much mercury had been expressed before the material was packed in the cavity. To overcome the defect he advocated a technic resembling that given in this paper.

Insert the filling, taking advantage of its plasticity and adaptability, and then remove the excess mercury. A filling placed according to the details set forth will be a revelation to those who have not practised this method or seen it demonstrated.

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### TROPICAL DUTY AS PREDISPOSING TO GINGIVITIS.

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BY P. S. TICHEY, LIEUTENANT, DENTAL CORPS, UNITED STATES  
NAVY.

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WHILE stationed at Guantanamo, Cuba, during the late war, I had occasion to observe an unusual condition of morbidity in the investing tissues of the teeth and gums of patients referred to me for treatment. This condition was so prevalent and so remarkably uniform in type that it served to interest me professionally to the extent of compiling certain records in an attempt to account for its presence.

The clinical picture presented in these cases was somewhat similar to the advanced stages of pyorrhea alveolaris, but differed from the usual manifestations observable in pyorrhea in that there were no typical pockets, demonstrable as such, and pus and the debris of an active and destructive bacterial infection could not be as readily expressed by the usual methods.

The pronounced hypertrophy of the gum tissue and the fact that there was much pain while the tissues were relaxed served to distinguish the condition as unusual, and occasionally it was noted that the gum tissue was of a faint blue color but without apparent localized areas or any identifying lines.

The patients invariably complained of a puffiness of the gum that was extremely uncomfortable, and generally the teeth were loose while apparently retaining all fibrous and membranous attachments.

Microscopical examination of smears made revealed the presence

of the usual organisms found in the mouth, and spirochetæ were sometimes demonstrated.

Had I been able to demonstrate the fusiform bacillus with any of the associate spirilla which are present in Vincent's angina, the diagnosis and treatment of these cases would have been greatly simplified, as the clinical symptoms, particularly the fact that there was always a considerable amount of pain and fetor, would have supported this diagnosis. These, however, were absent, and there was also an absence of the typical lesions associated with this form of infection.

Pyorrhea was, of course, immediately considered, but was not thought sufficient to account for the apparent widespread nature of the infection, and as there was present always local pain without trauma, and a lack of gingival pockets generally associated with the advanced stages of this disease, this theory was not tenable.

The various oral infections with which my practice has made me familiar were reviewed in the light of the clinical evidence presented, coupled with symptoms and history of each case, and each was eventually discarded.

Proper laboratory facilities not being available for extensive investigation, I made attempts to clear up these cases by palliative methods designed to make the patients as comfortable as possible in the hope of arriving at some specific and regular technic. In this I was never wholly successful, inasmuch as, while I could do much to alleviate the condition in question, I never could be sure just what specific effect my remedies had.

The possibility of rachitic conditions was given some thought in the light of the capillary bleeding complained of by the patients, and although there was a typical blue gum condition in some cases the diet served aboard ship would generally be considered as all that would be necessary to preclude the possibility of anything of this nature.

It being my first experience in the Tropics, and not having observed this condition elsewhere, it seemed reasonable to me to assume that the climate may have had something to do with the matter, particularly as all patients stated that they had experienced no discomfort until the arrival of their ship in warm waters, and men who had been in the Navy for some years informed me that this condition was not unfamiliar to them, generally clearing up on their return to colder climates and without medication.

This assumption that climatic conditions, if not primarily responsible for these cases, at least were a considerable factor in producing the conditions observed, was forced upon me by the insistence of the patients themselves, the uniformity of the cases, and particularly the similarity of the history in each case.

In trying to seek justification for this assumption it occurred to me that it might be possible that climatic conditions might involve a change in the habits of the men aboard ship, particularly in respect to the diet, which fact might be the basic factor involved. I reasoned somewhat as follows:

In the main our men are of the Nordic branch of the white race—men whose natural environment has been for many generations the North Temperate Zone, with its changing seasons. These men are most active when they receive the external thermal stimulant brought about by seasonal changes of temperature, and without which they become listless and lazy. A change of temperature is a muscular tonus, which brings tonicity to the blood vessels that ought surely to energize the most minute capillary found in the soft tissues of the mouth. On the other hand, in a constantly warm temperature the blood vessels, as well as the muscular structures, become flaccid, due to the lack of external stimuli, which I believe retards their tonicity, and it is possible that a degree of stasis may be established in the microscopical structures, thus lowering that structure's resistance to such an extent that if its environment contains both bacterial or mechanical irritants the structure succumbs to the bacterial invasion and becomes diseased.

Beside the depressing effects of a constantly warm climate upon the body of one who is accustomed to seasonal changes of temperature, we can view the cause and effect of diseased soft tissues of the mouth from the standpoint of an improperly balanced diet. Scientific research has made it clear to us why men like those in Dana's *Two Years Before the Mast* suffered from scurvy. The mouth conditions of men which I have examined were much the same, but in milder form. Aside from good meats and plenty of that tuber which is so well known to every American, a sailor wouldn't walk athwartship for anything else except ice cream, cookies, and candy. He doesn't care for "trimmings" or "side dishes." He knows nothing about "fat soluble (A), water soluble (B) and (C)," etc., and it seemed likely that some of my patients suffered from a lack of vitamins, or antiscorbutic food.

Men on board our vessels are not deprived of green vegetables, even in the Tropics, where they are procured at a great expense, but a great number of these men will not heat "hay." They demand beef and "spuds," and pork and beans; that is their diet. I have seen men go ashore after being aboard for months and order steak and eggs.

It is not that a balanced diet is not provided aboard ship—it is because the men choose from this diet what appeals to their fancy—that it is possible to observe mouth conditions that are typical of an unbalanced ration. A nitrogenous equilibrium is an accident when the men consider only their personal likes and dislikes.

This, I think, accounts for the conditions which I have observed. Presumably other dental officers on tropical duty have observed it also and have been more successful in treating it than I have.

Lieutenant Daniels, while on duty in Pensacola, reports that the first 30 cases to report for dental treatment, each month for 12 months, an average of 9 were cases of gingival disturbance. (H. A. Daniels, Lieutenant (DC), United States Navy: "Effect of Carbol Fuchian Stain on Diseases of the Gingivae." U.S. Naval Medical Bulletin, January, 1923.)

A summary of my observations may be briefly noted as follows:

That tropical service would seem to predispose certain unusual inflammatory conditions of the attaching tissues of the teeth.

That the diet may be a factor in controlling these conditions.

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## THE MANIPULATION OF MODELING COMPOUND AND SECTIONAL MODELING COMPOUND IMPRESSION TECHNIC.

BY J. J. HAAS, LIEUTENANT, DENTAL CORPS, UNITED STATES  
NAVY.

THE manipulation of modeling compound is not difficult when one has a knowledge of its properties or behavior under various circumstances. Compound if not properly heated can not be worked to advantage. It is generally heated by placing it in hot water or in a Bunsen flame. By softening compound in this way one is apt to obtain a compound that is not sufficiently soft to obtain an accurate detailed impression or so warm as to burn the mucous membrane. If compound is placed in a Bunsen flame and heated until its plastic properties are destroyed and it blisters or is scorched, it can not give an accurate impression.

An ideal impression material should have the following characteristics:

1. It should be composed of some material that will not be unduly disagreeable to the patient.

2. It should become plastic at a temperature the oral tissues can tolerate.

3. It should copy accurately the fine lines and irregular surfaces to which it is applied and retain the form so copied, without becoming distorted in removal from the mouth.

4. It should harden in a reasonably short time.

5. It should not expand, contract, or warp at ordinary temperatures to any appreciable degree.

6. One should be able to correct an impression by adding to or taking away from the original mass.

Various impression materials such as plaster of Paris, modeling compound, beeswax, paraffin, beeswax and paraffin combined, and gutta-percha are on the market. Of these, the first two only are of value.

Plaster of Paris has been discarded to a great extent because of its disagreeable taste and because one can not add to a plaster impression (full or partial) for correction. One of the greatest faults or disadvantages of plaster is its tendency to expand. Plaster expands thirty-two ten-thousandths of an inch 32 minutes after setting, and after 24 hours' setting it expands three times that amount. In taking an impression for a partial case, in which we always have undercuts, the plaster breaks or the operator breaks it in removing the impression from the mouth. Sometimes it breaks clean, but usually it does not. It usually breaks and leaves small pieces at the gum margin and at the edentulous sections, which are needed in producing an accurate cast. If some of the small pieces are crushed, lost, or too small to be replaced, the operator usually tries to reproduce them by building up the deficit with wax, and in no way is he able to reproduce the lost section accurately. Modeling compound is the only material available at the present time which possesses the characteristics desirable in an ideal impression material.

In order to manipulate modeling compound successfully we must first understand its behavior and properties. Modeling compound at ordinary temperatures is a hard, brittle mass. It will break before it bends, and it breaks clean. Modeling compound, when heated to 120° F. in moist heat, will bend, hence the term "the bending stage." Compound at this temperature will not take a detailed impression. When compound is heated to a temperature of 150° F., it is soft and can be molded to take a detailed impression, hence the term "the working stage."

The oral tissues can withstand a temperature of 150° F. comfortably, and compound in this stage can be controlled by the operator. If the temperature is raised above 150° F., the compound becomes sticky, can not be adapted to the oral tissues, as it will scorch them, and it gets beyond the operator's control. Compound is best controlled by using a Supplee heating element, which keeps the upper half of the basin of water at a temperature of 150° F., and the lower half is about 20° cooler. The latter has advantages, because the compound will not adhere to the bottom of the basin at that temperature.

In taking any impression, full or sectional, a tray must be adapted to fit the case. A suitable amount of compound heated to a temperature of 150° F. is secured and seared on the tray. This is done by holding the compound in the Bunsen flame until it sputters and then attaching to it the dry tray. The modeling compound is then

formed on the tray to suit the case and the tray and compound is immersed in ice water, tray side down. The compound is submerged half its thickness for 10 seconds. The reason for doing this is that we wish to have a supporting harder mass for the softer molding mass upon which the impression is made.

The mass is then introduced to the desired place in the mouth and the print is taken. The mass is then chilled in ice water, removed, and the water shaken off and the printed surface is glazed with a Tench mouth blowpipe flame. This glazing of compound is necessary for an accurate detailed impression of the part desired. The mass is then tempered. This is accomplished by dropping it into water at a temperature of 150° F. The glazed surface is usually about 170° F. and would scorch the oral tissue if adapted without tempering. When properly tempered it is introduced into the mouth to the desired location and pressed to place. It is then chilled thoroughly with compressed air or syringe full of ice water. The impression is then removed and placed in ice water for final or thorough hardening. The technic described above is called the double introduction method. It is also used in making any correction of full or partial impressions. The foregoing gives the reader a brief idea of the behavior and manipulation of compound, also the advantages of compound over plaster.

In sectional modeling compound impressions one must have the foregoing in mind at all times. The writer will try in a brief way to describe how a sectional compound impression is taken. Let us assume that we wish to take an impression of a full upper set of teeth. The technic to be described will hold good for any case in both upper or lower jaws with all the teeth present or some missing. The first step is a mouth examination, paying particular attention to undercuts. Learn to recognize undercuts and in what direction an impression or section of an impression can be withdrawn without distorting it. In a normal case a sectional modeling compound impression is taken in five seconds, two palatal or lingual, two buccal, and one labial. Sometimes the palate can successfully be taken in one section. This condition arises when the teeth diverge occlusally and are not very bell shaped. Also there are cases in which one must take two buccal and two labial sections. This condition arises when the undercuts are so situated as to make it impossible to take it in three outer sections.

The operator adapts a tray to the right half of the palate as previously described. The tray should extend from the median line of the palate to the lingual surface of the teeth and should extend posteriorly to the junction of the hard and soft palate. Sufficient compound is seared on the tray and an impression is taken (double introduction technic) of the right half of the palate including the lingual

sides of the right anterior and posterior teeth. The impression is thoroughly chilled and removed and placed in ice water for absolute hardness. Then with a sharp knife (and right here allow the writer to say a word about cutting compound. Always have a sharp knife and always have compound hard before cutting it. If compound is semihard one is apt to distort it by cutting it with a knife; another thing in cutting compound, always cut small pieces at a time; never cut off large pieces, as the knife forms a wedge in the compound in cutting and will chip off more than is wanted or else it will fracture the impression) the impression is cut at the median palatal angle at a  $45^\circ$  bevel and also cut at a  $45^\circ$  angle at the lingo-occluso and lingo-incisal angles inward; that is, toward the tongue. Then the impression is tested by placing it in its place in the mouth and observing if it is adapted to the required surfaces, and corrections made if necessary.

Cocoa butter is smeared on the surface which is to face the opposite section. Cocoa butter is used as a separating medium to prevent the sections from adhering to each other.

A tray is adapted for the left palatal side, and, with sufficient compound seared to it, is inserted into the mouth in which the right section is already in place. The impression is made, the mass cooled with a syringe full of ice water, removed, and placed in ice water for final hardening.

The second section has been adapted to the first section at the median line, hence no trimming is necessary there, but the lingo-occlusal and lingo-incisal angles should be trimmed at an angle of  $45^\circ$  inward as the right section was trimmed. The two sections are now placed in the mouth and inspected as to their accuracy. If not accurate, corrections should be made before proceeding any further. It will be noted that when the left section is in its proper position it holds the right section in place, due to the  $45^\circ$  bevel made on the right section at the median line.

A tray is now adapted for the buccal section. This section usually includes the molars, bicuspid, and half of the cuspid. The writer has observed from experience that it is easier to have the section stop halfway on a tooth than at the approximate space, as the labial or adjoining section is easier adapted on the labial surface of a tooth than in an approximate space. This section also includes the occlusal surface of the teeth. The tray is usually bent at an angle of  $90^\circ$  to support the compound that is to take the occlusal surfaces. Compound in a sufficient quantity is adapted to the tray, and with the palatal sections in place, with the approximate surfaces of the sections smeared with cocoa butter, the buccal section is pressed to place, chilled with ice water, removed and chilled to absolute hardness in ice water. The anterior side of the buccal section is bevelled at a  $45^\circ$

bevel distally and should include just half of the cuspid. The other buccal section is made just as described. Then all four sections are replaced into the mouth and the remaining or labial section is adapted.

After all sections have been made it is assembled and inspected for imperfections in the joints. The impression is now assembled and luted together with a hot spatula, boxed and poured with Spence plaster. It is a good policy always to box and pour the impression as soon as it is made, for if the impression is permitted to lay around, say overnight, the temperature in the room is usually increased to such a point as to bend the compound out of shape. The cast obtained from the above technic is as near accurate as it is possible to obtain with the impression materials available to-day.

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### THE WIRING METHOD OF TREATMENT FOR FRACTURES OF THE MANDIBLE.

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BY E. H. TENNENT, LIEUTENANT COMMANDER, DENTAL CORPS,  
UNITED STATES NAVY.

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THIS article is not offered as one explaining a new method for treating simple or compound fractures of the mandible or as an elaboration on one, but is written more as a detailed review of a method which is being used and is indicated in most cases. The method is only applicable to those cases with teeth and to those cases having a reasonable bite. In the naval service, fortunately, we have the first condition and usually the second. We are all familiar with the scheme, yet, without opportunity to practise it, one is liable to forget the finer points.

At Hampton Roads during the period between December, 1917, and March, 1920, many cases of fracture of the lower jaw were treated; not merely fractures of the alveolar plate, but complete dissolution of the continuity of the body and ramus. Some were simple fractures, but most of them were compound and multiple. At the League Island hospital in the past ten months ten fractured jaws have been treated, all compound and multiple. In practically all of the cases the wiring method was used. When there are enough teeth present, other than those that may be in the line of fracture, wiring is the best method to employ.

The preliminary treatment of any compound fracture consists in clearing the wound of foreign particles and approximating the parts. If the wound is painful, nitrous oxide gas and oxygen may be used. Apply a snug Barton bandage, have an X-ray examination made, and then put the patient to bed, with an ice bag applied to the injured part while waiting for the X-ray plates to be developed and other preparations to be made.

A study of the X-ray plate will reveal the angle of fracture, any fractured or impacted teeth present, and will assist in determining the advisability of keeping a tooth that may be in the fracture area. In a case involving a third molar, that tooth should invariably be removed, for it is a very difficult tooth to get out should conditions demand it after the jaws have been splinted. In the case of a third molar that has not yet perforated the mucous membrane, when the fracture involving that tooth is not compound and the tooth does not tend to hold the approximating ends apart there remains a question as to whether or not it should be removed. One's judgment is really put to a test here. The writer has in mind, of course, third molars that are simply unerupted, not impacted molars that surely would give trouble under ordinary conditions.

In preparing for the operative treatment at least 32 brass ligature wires, 24-gauge, should be well annealed; short-jawed scissors, pliers, conductive syringe, needles, and procaine should be made ready. If teeth are to be removed, forceps, elevators, and surgical burs must be at hand.

Upon putting the patient in the chair clean the mouth thoroughly, remove any tartar, and temporarily fill any cavities. Look for any putrescent pulps that are liable to give trouble while the jaws are splinted. It is best to open a tooth containing a putrescent pulp, remove the first third of the diseased tissue, and seal in tricresol and formalin. Should this tooth give trouble after the splints are on, a small hole at an acute angle to canal can be made easily with a spear pointed drill directly into the pulp canal and the usual treatment carried on. These preliminary but very important functions attended to, make the necessary conductive anesthesia injections. If a putrescent pulp or tooth is to be removed, it should be done after anesthesia is thus obtained.

The conductive injections are to be made at the nearest foramen on both sides of the field of operation. For a mandibular injection use 2 c. c. of a 2 per cent. solution, and for a mental injection usually one-half of 1 c. c. will suffice, except where the field of desired anesthesia is between the two mental foramina; then 1 c. c. of the anesthetic solution must be injected on each side, making sure to force it into the canals with the finger at the time of the injection. The usual 20-minute wait is required for the mandibular and about 10 minutes for the mental anesthesia.

As soon as anesthesia is obtained it is well to determine the relationship of the teeth of the lower jaw to those of the upper. Every mouth, no matter how irregular the teeth may be, has a definite bite, one that is comfortable to the patient and is easily recognized by him once the teeth are put in their accustomed occlusion. In the nearly normal bite the patient's feeling is your guide, while in one

of very irregular teeth the abrasions on the cusps and dental planes should help you.

The bite being determined, the next step is to decide on the line of stress—that is, which of the teeth present must be secured together to receive the “pull” necessary in opposition to the natural tonicity of the muscles finding insertion in the lower jaw.

The experienced operator does not take long to accomplish all of the above, and is soon ready to start wiring. The softened wires are bent on themselves in the middle, and dental tape is threaded through the loop thus formed. Carry the tape through the contact points of the teeth and draw the wire inward through the interdental space, then repeat with the tape on the opposite side of the tooth, but drawing the wire outward this time to form a loop about the neck of the tooth, with the free ends of the wire next to the cheek. Draw the wire up tight and twist with the fingers enough to keep it from slipping, and then with flat-nose pliers twist the wire ligature up snug about the neck of the tooth, using care not to catch any of the gum under the wire, and yet be sure that it is up above the gingival ridge. The operation is repeated for each tooth which is to carry a ligature. All twists of the wire must be to the right, and at this stage all ends must be left long. If care is used, very little pain will be experienced on the upper jaw. Now, with all wires in place, instruct the patient to relax his muscles completely so that the lower jaw may be brought as near as possible to its correct position. While the muscles are relaxed it is easy to bring the teeth into their former relation to each other. Once in position, remind the patient to keep relaxed and have him bring his hands up to the jaw so that each side of the body will rest in the palm, and at the same time make gentle pressure upward and hold the position until told to relinquish it. Now ask the patient if his teeth feel comfortable and if they are in their natural position. He can quickly tell you. It is important that the head must be on or a little forward of the axis of the rest of the body, otherwise the muscular strain will distort the parts.

Being satisfied that all is well, twist the free ends of the opposing wires with the fingers, leaving the long ends at right angles to the line of stress. Do this to all wires, twisting to the right. Once more make sure that the correct wires are coupled together and that all teeth are in occlusion. Being satisfied, draw up with flat-nosed pliers until the patient feels a good pull on the teeth, which he will never fail to indicate. Next cut the protruding wires off about one-half an inch from the beginning of the twist, and then with pointed-nose pliers bend the projecting ends in, making the wire bend at about the middle of its length, so as not to disturb the stress.

Some operators cover these wires with varnished cotton or gutta-percha, but that is not necessary, for with little care in bending the

wires there is not any danger of irritating the mucous membrane of the cheek or lips, and it is far more sanitary to leave the ends uncovered.

The case should be watched each day, spraying all parts that can be reached with the dento-spray, using a solution that will not corrode the wires. All wires must be kept taut, for one loose wire will spoil the results, besides making the gum sore about the neck of that particular tooth.

Wires will break, no matter how much care you may give the case, and these must be replaced by new ones. Experience has taught that when one wire breaks, both ligatures must be renewed, for when twisting the unbroken one for the second time it will surely break.

The technic of replacing broken ligatures is as follows: With the pliers straighten and untwist the bent ends and separate them. Cut the doubled wire about the neck of the tooth, place the middle of a 10-inch piece of dental tape between the short ends of the wire and then twist the ends together forming an eye. Seize the other end of the wire with the pliers and, using counter pressure, pull the wire from around the tooth, making the tape take its place. This in turn becomes the means by which the new ligature is carried to place; that is, by reversing the process.

Throughout the period of treatment keep a snug Barton bandage on the head. A word of caution about fastening the safety pins at the side of the jaw is in order. After putting the pin in position seize the pin part with hemostat and hold it rigid until the pin is fastened. When the lower jaw is in two or three pieces, a portion may be easily displaced by accidental pressure while pinning with safety pins.

Infection frequently appears after the fracture is in splints. When pus is present, simply incise the gum from below upward from the junction of the cheek or lip with the gum. With periosteal elevators rip away the soft tissue from the bone for a distance of about three-eighths of an inch on either side of the line of fracture and retract. Where pus has been present for 15 or 20 hours, the outer plate of the bone covering that area will be very thin and can easily be broken down with the chisel and mallet, but the bone must be supported by an assistant while using these instruments. Of course a fissure bur may be used. It pays well to make a good exposure of the infected area and thoroughly curette, making sure that there are no small particles of detached bone left. Place one or two sutures, as the case may demand, leaving enough opening to dress from above. With a pipette flood the area with dichloramine T solution and insert a small sterile gauze wick, carrying it to the bottom of the wound. From this time on the healing will proceed slowly, and the case must be dressed each day until the wound is filled in from the bottom. Of course the dichloramine T solution is a matter of choice.

Diet must of necessity be liquid or thin enough to be drawn through the teeth. Never extract a tooth for the purpose of feeding. Such items as the following are useful: Soups—turtle, tomato, pea, chicken, oyster, and vegetable. The semi-liquid substance of creamed celery, potatoes, cauliflower, and onion can readily be drawn through or around the teeth. Coddled eggs; eggnog; soft custards; gelatin; chicken jelly; milk; tea; cocoa and coffee with plenty of cream; and fruit juices of all kinds.

There is one point that must be considered regarding fractures posterior to the last molar tooth, and this is to be considered whether the wiring method is used or not. It is the question of whether the two opposing ends of bone should be wired together, opening from the outside for the purpose. Just now I have under observation a case which was fractured and wired about six months ago, and recent X-ray examinations show unmistakable disintegration of bone tissue where the wire passes through, and I believe it is only a question of time before this wire will have to be removed. The only time such a wire is indicated is when there are two lines of fracture, one at the angle and the other at the neck of the condyle. In the case of a single line of fracture the joint action of the two pterygoides on the inside and the joint action of the two parts of the masseter muscle on the outside of the ramus supported by the heavy or thick gum tissue are quite sufficient to keep the bones lined up.

Just a word about the number of teeth to be wired. It is noticed that Marshall and Blair seem to be content with wiring only four sets of opposing teeth—that is, two upper to two lower on each side—and many dental officers with whom I have discussed the subject think that sufficient. Experience has taught me that the greater the number of teeth wired the more certain is success.

The writer has been questioned several times lately as to whether he did not think a Barton bandage sufficient. Most emphatically no. Of course the bone may unite, but faulty occlusion is sure to result. For obvious reasons it is best to restrict the liberty of fracture cases until all splints have been removed.

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## THE USE OF THE MODIFIED BAKER ANCHORAGE IN THE NAVAL DENTAL SERVICE

BY W. L. DARNALL, LIEUTENANT COMMANDER, DENTAL CORPS,  
UNITED STATES NAVY.

THE principles involved in the treatment of mandibular fractures are the same as those applied to fractures of all bones, namely, that there be a proper reduction of the fragments, their retention in apposition, and proper care of the tissues of the mouth. Main-

tenance of mouth hygiene is a very important fact and becomes more of a necessity because of the possibility of infection from the oral cavity.

According to Kazanjian, appliances for the treatment of maxillary fractures fall into two distinct classes: (1) Those which are designed for the immediate fixation of the fragments, and (2) those appliances and splints so constructed as to cause a slow reduction of the fragments.

The methods at hand for the immediate use in naval service are intermaxillary wiring and the modified Baker anchorage.

Intermaxillary wiring is properly classified under the head of immediate fixation of the fragments and under certain conditions this is preferable to other forms of retention.

In enumerating the advantages of intermaxillary wiring, Eby emphasize the following points, which make this method particularly valuable where immediate fixation of the fragments is desired.

(1) When sufficient teeth remain in the arch all parts are immediately brought into their proper relation by direct fixation, thereby establishing a condition of physiological rest.

(2) This method requires very few instruments and little material.

(3) Much time ordinarily consumed in the making of splints is saved.

(4) Its accomplishment under all existing conditions with comparative ease to both patient and operator.

Of the disadvantages which may be mentioned, the greatest from the standpoint of the naval dental surgeon is the liability of strangulation from nausea when transporting cases at sea. In connection with this possibility, Eby cites lessons learned in the late war, and makes reference to a statement that was current in America to the effect that the British, during the early days of the war, lost many cases due to strangulation brought on by seasickness. That this factor is a vital one was evidenced by the promulgation of an order in the American Expeditionary Forces, prohibiting the embarkation of casualties for home with the intermaxillary form of wiring in place. These cases, on arriving at the point of embarkation, had these wires cut, allowing the jaws to remain open until treatment could be resumed. Other apparent disadvantages are the inability to properly feed the patients so wired and the possibility of not being able to maintain mouth hygiene.

Blair states that in treating fractures of the jaws it is of not so much importance to be acquainted with the large assortment of various forms of apparatus that have been devised as it is to understand the muscular action that caused displacement.

That the principles of orthodontia enter into the treatment of fractures is best brought out by Eby, who says: "In orthodontia

tooth movement and retention is the object to be effected by means of anchorage of certain mechanical apparatus upon the teeth. In maxio-facial surgery the movement is of bone fragments en masse, and their retention is the object by the attachment of mechanical apparatus to the teeth. The problems of anchorage are similar in many respects, but vary with condition of environments, etc."

The modified Baker anchorage which has recently been added to the supply table places in the hands of the dental surgeon an appliance which can be used either for immediate fixation or for slow reduction.

This method consists of securing a metal bar, to which lugs are soldered at intervals, to the labial and buccal surfaces of the upper and lower teeth by means of small wires passed around the teeth and twisted to the bar.

If direct fixation is desired the arches can be wired together, thus adopting the Gilmer principle, or elastics may be supplied.

In the gradual reduction of fractures, consolidation of the displaced fragments has usually progressed to a greater or less extent. In those cases of lateral displacement of the fragments, this appliance is particularly suited, intermaxillary traction being applied by using elastics, thus combating any tendency toward a deviation of the principal fragment.

Stress is applied according to the location of the fracture, care being taken to carry out fundamental orthodontic principles.

In those cases to be transported by water a sufficient number of elastics should be used to keep the jaws in normal occlusion, and yet permit of forcing the jaws apart by grasping the chin and pulling it down.

There will be those who question the advisability of this form of appliance at sea, but as a favorable prognosis depends upon early reduction of the fragments, the application of this form at sea will permit of early treatment in certain cases which would otherwise have to be postponed.

The advantages of this type of appliance may be summarized briefly as follows:

The intermaxillary elastics or wires, whichever method of fixation has been elected, may be removed and the mouth cleansed without disturbing the arches themselves. That this is an important phase in the treatment of all fractures of the mandible is stressed by Speed, who says: "Many failures of union of the inferior maxillary may frequently be traced to the lack of proper oral sepsis. It is of great importance that this phase of treatment be not overlooked in the selection of a suitable appliance."

The possibility of breaking the wires used in ordinary intermaxillary wiring is eliminated also by the use of the Baker modification.

While this form of appliance may not meet the requirements in all cases, it will take care of a vast majority, especially in peace time, where the cause has been traumatism, without destruction of bone tissue. It gives to the service a method of combating the factor of strangulation in transporting fracture cases at sea.

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### CEMENTATION.

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BY H. E. HARVEY, LIEUTENANT COMMANDER, DENTAL CORPS,  
UNITED STATES NAVY.

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THE manufacture of dental cements is shrouded in mystery; that is, the exact details of their preparation and composition. This is due to business acumen, and coincides with the advice of Thomas Edison, whose faith lies not in patents but in the perfection of processes to obtain the desired results, the assistance of skilled workingmen, and secrecy. Secret formulæ, however, are open to the general objection that more may be claimed for them than is substantiated. Tests by unbiassed parties are valuable. All are familiar with the claims of manufacturers as to the merits of their particular products.

We are informed that the cements in common use have a basis of zinc oxide and phosphoric acid. A mixture of these two substances sets almost as soon as they are brought together, with the evolution of considerable heat. Therefore modifiers are necessary to produce the articles of commerce which set slowly, with properties varying as to the uses to which they are intended. The composition of these modifiers as well as the special treatment of the zinc oxide and the acid constitute the trade secrets. With a knowledge of the constituents and their treatment we might not be any better off from the standpoint of practical users; however, such knowledge would provide a means of comparing in an intelligent manner claims set forth for this or that special product.

The mixing of cements for dental operations is usually delegated to an assistant who, after very meagre instructions and with little or no thought or knowledge of the chemical reaction involved, sets forth often armed with a flexible steel spatula and an insignificant slab at room temperature.

Buildings are only as strong as their foundations, and this applies to cementation, particularly in these days of inlay and three-quarter crown attachments. Failure of inlays at the gingiva is of frequent occurrence, and in the opinion of some this is due, to a large extent, to carelessness in the procedure of cementation. To overcome this it is recommended that the cavity be thoroughly coated with the cement and that the inlay also be carefully covered with cement, with

especial reference to the gingival portion. This point is well taken, but perhaps improper mixing of the cement is to be held responsible in more instances for the failure. Sufficient working time between the completion of the mix and the time of setting is essential if undue haste is to be avoided in performing a cementation. Some individuals attempt to obtain more time by making a thin mix, one which will flow freely from the spatula. This is improper and has two dangers. The first is that an excess of liquid is probably present, resulting in a compound which is not dense and more or less weakened by a honeycomb structure as the surplus acid dissolves out. This, then, presents a favorable condition for the absorption of food-laden saliva, the putrescence of which accounts for the odor so often noticed upon the removal of gold crowns. The second is that improper incorporation of the powder and liquid has probably occurred, as haste being thought essential, the mixture is made and used too quickly.

In the mixing of cement we are dealing with a chemical reaction, and with this in mind it is necessary to bring into play certain principles which, according to our knowledge, will assist in the reaction.

Outside of the personal equation four items enter into consideration—the slab, the spatula, the liquid, and the powder. The properties of each should have our attention. The slab should be of sufficient size to be grasped easily and firmly and with a large surface for facilitating thorough spatulation. It should also have bulk, which will assist in absorbing a portion of the heat generated by the reaction. To this end the slab one-quarter of an inch in thickness would seem of little value. One an inch in thickness, with other dimensions in proportion, is suitable. A warm slab makes haste for the reaction, and this must be avoided. Room temperature in a well-heated office approximates summer temperature so closely that the slab should be cooled each time before use. Avoid extremes; to keep the slab in an ice box or in ice water would result in condensation of water from the atmosphere, and this, if incorporated in the mix, would seriously affect the balance of the reaction. By placing the slab under a trickle of water at the faucet, the temperature of the water and the resultant evaporation will reduce its temperature sufficiently.

The spatula should be one which is not flexible and which has a good broad surface with an evenly bellied blade. The purpose should be to get an even thorough mixture of the powder and liquid with firm spatulation. A thin flexible spatula if pressed to conform to the surface of the slab presents such a thin edge to the mixture that most of it goes over the upper surface of the blade as it moved back and forth. Spatulas of stellite are the only ones which seem to fulfil the requirements, and in using these the blade must necessarily

be held so that its full length comes into contact with the surface of the slab. Thus as firm pressure is exerted as the spatula is moved back and forth the mass will be thrown under the bellied surface of the blade rather than escaping over it without pressure. This makes for an intimate mixing of the liquid and powder.

Being a chemical reaction, the mixing of cement generates an appreciable amount of heat. This may be strikingly illustrated with certain of the commercial products, which will produce as much as 180° F. when mixed with undue haste. When it is recalled that water at 140° F. is too hot in which to hold the fingers, it will be appreciated what 180° means; and this for a material possibly to be inserted in a cavity sensitive to the slightest temperature change. To avoid a degree of heat closely approaching 140° F. several precautions can be taken, one of which was mentioned—cooling the slab. When making the mix a large portion of the surface of the slab should be covered with the mass, thus utilizing the cool surface of the slab to absorb some of the heat. This also exposes a large surface of the mix to the cooling effect of the air. One of the greatest factors, however, is that the mix should be slowly made; this, besides giving time for the reaction to take place, gradually likewise gives opportunity for the dissipation of heat. The powder should be placed well over to one side out of the way. The first incorporation of the powder into the liquid is the critical point; just enough powder should be used to color the liquid, which is then given thorough spatulation over a large surface. This first mix is the initial chemical reaction, and here much of the heat can be dissipated. If this is done a cooler mix is produced and one which sets very much more slowly and denser than a hot mix. After this has been accomplished the powder may be added in portions well spatulated after each addition and spread over the same surface. As the mixture is being made with pressure, streaks of the slab may be seen through it; a clear streak following the spatula is an indication that it is being properly made, granulations or unevenness to the contrary. Thus an opportunity is constantly present to check a tendency to haste.

Powder is added until a consistency is obtained which when elevated on the spatula will leave it in a slowly forming drop, and as it strikes the slab will maintain its globular form an instant and then slowly settle. If a slow initial mix has been made under the conditions set forth, plenty of working time will yet remain in which to perform any cementation. It is common practice to get a mix of a certain consistency and to spatulate this until it thickens. This is not correct, as one is waiting for the initial setting to take place on the slab and consequently appreciably shortens the working time. The proper procedure is to continue to incorporate additional powder until the required consistency is obtained. An inlay set with

such a mix can be forced easily to place and will not raise from its seat. In the past considerable difficulty has been experienced by some in that after an inlay was seated it was necessary to apply sustained pressure in order to prevent outward displacement as the cement set. This is said to be due to expansion of cement due to the formation of gases generated by the heat induced by too rapid a mixing. The density of the finished product apparently bears a ratio to the amount of gas generated and this to its consequent porosity.

Beside helping to overcome an excess temperature change a mix correctly made has other advantages, and not the least valuable of these is the great addition to the length of working time before it sets. Made as set forth the mixture remains in the plastic stage a very considerable time.

Experiments, particularly those of Dr. Joseph Head, of Philadelphia, have shown that cement after setting exhibits no adhesive properties, but that it depends for retention on accurate adaptation and undercuts. As is the case in the manipulation of amalgam, cement should be plastic when inserted in order that advantage of this property may be taken to secure uniform and accurate adaptation.

Often it is desirable to use a cement lining or base as preparatory for some other filling material. In making a mix for this purpose only a slight change is made, and this is not in making the mix thinner, but in making it thicker. An endeavor to line a cavity with a thin mixture of cement presents its own difficulties, not the least of them being a tendency to get it every place but where needed; usually it exhibits a particular affinity for the margins, where it can do the most harm. The mix is made as outlined, except that instead of stopping at the point indicated additional powder is added until the mix shows a slight tendency to crawl after the spatula. The face of a small serrated plugger is inserted in the mass, and as it leaves a quantity of the cement will adhere to it, with one or more finger-like projections of cement. It is transferred to the cavity, being stiff enough to go in feet first, the plugger is detached and a smooth, plastic instrument is used to adapt it to the cavity. If this is done with a mix which has been stiffened by adding powder and not by allowing it to partially set, it will be found very expedient and there will be plenty of time for adaptation.

Cements properly mixed are to a large degree insoluble in the saliva of some mouths, but they are not very resistant to attrition.

To summarize:

Use a large slab.

Use a cool slab.

Use a stiff-bellied spatula.

Incorporate a very small portion of the powder at first.

Grind the powder and liquid together with forceful spatulation. Cover a large area of the slab.

Stiffen to the desired consistency by the addition of powder and not by spatulating a thin mix until it has partially set.

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### CLEAN COTTON PELLETS.

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BY H. E. HARVEY, LIEUTENANT COMMANDER, DENTAL CORPS,  
UNITED STATES NAVY.

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COTTON pellets for dental use have been recently added to the supply table, but a holder or dispenser for these pellets was not adopted, due to the fact that one could not be found which would answer the requirements of surgical cleanliness.

Observation leads one to believe that these pellets as they are commonly used are a source of danger, inasmuch as they seem to present a means by which the holder or remaining pellets may be contaminated and thus make possible the carrying of infectious material from one patient to another. The cotton pliers which are used for handling pellets come into contact with the secretions of the mouth or are otherwise contaminated; the pliers being then used to pick up another pellet gives reason to infer that the holder or some of the remaining pellets will be touched and thus open an avenue of cross infection. The manufacturers offering no solution of the problem, it occurred to the writer that some device might prove acceptable which would permit of its being sterilized after each patient. To this end the following suggestion is offered.

Use a piece of ordinary galvanized iron-mesh wire, such as is for sale at all hardware stores, the mesh to be five-sixteenth-inch squares, soldered at the intersections. This wire mesh is obtainable in the Navy on the medical supply table as the wire splinting material, designated as "Splint, wire mesh for." A circular piece 3 inches in diameter is cut, and the sharp edges smoothed with sandpaper discs. The centre is pushed in from one side to make a dent sufficiently deep to cause the centre of it to stand away from a flat surface one-fourth of an inch when placed upon it concave side down. The circumferential edge should rest evenly on the surface. This may be nickel plated if desired, or may be made of some other suitable material, and represents the finished product.

The pellets, to prevent contamination, should remain in the original container until used, and only those to be used at a single operation should be removed at one time. A flap  $1\frac{1}{4}$  inches square is cut in the side of the original pasteboard box container and bent outward; this opening permits of a small quantity of pellets being

removed with pliers and the flap to be pushed back to prevent the ingress of dust, etc. The routine established is to place a clean paper cover on the bracket table for each patient, and on this in the proper position a bunch of pellets which have been removed through the window in the container with a pair of surgically clean pliers. Over these is placed the wire mesh concave side down, settling it slightly so that it rests evenly on the table. As the pellets are used they are picked up one by one through the spaces of the mesh, which prevent more than one from being lifted at a time. At the conclusion of the appointment the mesh is lifted away from any remaining pellets and is sterilized by boiling with the other instruments in preparation for the next patient. The remaining pellets are placed in a reservoir for resterilization in the autoclave. A fresh lot from the original container is used for each patient.

While the above does not answer the requirements for a strictly aseptic technic on account of the placing of the pellets on the paper and the use of them from the original container, it does overcome the possibility of carrying infection from one patient to another, and this seems sufficient for the usual dental operations. A sterile operation, such as is indicated for root canal work, would require a slight modification is that the pellets should be previously autoclaved and laid on sterile gauze before the wire netting is placed over them, or, in lieu of this, the routine outlined above may be followed and each pellet sterilized in the molten metal sterilizer immediately before use.

Correspondence with one of the manufacturers of pellets elicited the fact that they are placing on the market a holder or dispenser devised to hold several sizes of pellets, to be used by extracting with the cotton pliers a pellet of the desired size just previous to use. The use of this holder, however, cannot be advocated, as it presents the very faults which we are trying to overcome. To visualize what may occur in any given instance, the following experiment was made: The holder was placed on the bracket table, and the cotton pliers used in the experiment instead of being moistened with saliva, were moistened with ink, and then used to remove the pellets from the holder. The results were what might be expected; the container showed ink stains about the orifices through which the pellets were extracted and caused discoloration of pellets subsequently removed through the same orifice. The casing of the holder is celluloid, and the complete apparatus is one not lending itself to any convenient method of sterilization. This represents the highest achievement of the manufacturers. The moral is self-evident.

## 1924 Meeting of the Canadian Dental Association in British Columbia

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THE date for the big meeting has been set. Dr. S. W. Bradley, President of the Association, after consulting with the men in British Columbia and ascertaining the opinions of the other Provincial Associations as to the most suitable time of the year to hold the meeting, has fixed on the week of August 4th, 1924.

Anyone who knows British Columbia will agree that a more delightful time of the year could not have been chosen. It will also give those who live in the East a chance to see the Great West at the time of the Golden Harvest, both while en route and returning.

Dr. W. J. Bruce, of Vancouver, Chairman of the Executive Council, was in the East during July and August. He took advantage of the opportunity to get in touch with any of the local men who were not on holidays and discuss with them plans for the meeting. Those who met him were much impressed with his enthusiastic hopes for a big successful convention. On his return to Vancouver, the various committees will be formed and organization work started right away. All he asks for is a good attendance from the East, and he says to assure the ladies that they will be looked after from the time they step off the train. Just because friend Husband is busy attending a big Dental Convention will be no hindrance to their having the most enjoyable and interesting week ever. A strong Publicity Committee will be formed, with headquarters in Vancouver and representatives in every Province. They will publish a bulletin from time to time giving the fullest information as to the plans for the meeting. The Provincial Representatives will have charge of the arrangements for the trip out there and returning, so as to get the most out of it from a scenic standpoint, entertainment features, etc.

Drs. C. A. Kennedy and W. B. Amy have already been appointed for Ontario and have been for some months studying routes, rates, etc. Their plan is to secure the best possible rate and by travelling as a group to reserve whole coaches, so that there will be ample accommodation and no crowding. In this way also, stop-overs at interesting points can easily be arranged. About 50 people have already notified Dr. Kennedy of their intention of going. Any who are going from Ontario should send their names to Dr. Kennedy, 86 Bloor St. W., Toronto, as it will help him in securing rates and accommodation. The trip across Canada by boat and train is going to be a big feature. Interesting announcements will be made in the near future.

The programme is commencing to take form. It will be largely made up of Progressive Clinics, as this type of meeting seems to meet

with the most favor, and offers a real post-graduate course. Those who imagine that all the dental wisdom in the country is to be found east of the Rocky Mountains are in for a rude shock. The Standard of Dentistry on the Pacific Coast is very high, and some of the biggest men in the various specialties of Dentistry are to be found there. For the different schools of thought from East and West to mingle and exchange their views cannot but result in great good to the Profession as a whole. From this standpoint, and also as an enjoyable vacation, seeing this wonderful Canada of ours, it will be a meeting that none of us can afford to miss. So start right now and plan to attend CANADA'S BEST DENTAL CONVENTION.

E. A. GRANT, *Secretary.*

Canadian Dental Association.

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## University Representation in Parliament

By ELIZABETH MONTIZAMBERT, B.A.

London Correspondent of *The Montreal Gazette.*

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CANADIANS in London have followed with great interest the discussion of the question of University Representation in Parliament before the Select Committee of the Ontario Legislature on University administration.

Most of the arguments advanced in protest against the adoption of any system of university representation showed a charming vagueness in the exact meaning of words and phrases, and so little logical reasoning that their authors must be closely related to the gentleman who has left on record his dislike of Dr. Fell.

Among these arguments one noticed a constant recurrence to the bogey that tyrannizes over so much public opinion—the dread of such an innovation being undemocratic.

Is Canada forever to cling to the shackling idea that democracy entails the apotheosis of the ignorant—that we must needs curtail our progress to suit the pace of the less intelligent members of our community, instead of making the term democracy synonymous with a state where all have freedom and opportunity to attain to a degree of education which entails privileges and which should be as honored as it is open to all?

Sir Thomas White has declared that university representation is unsound, undemocratic and, moreover, “not suited to the conditions of this country at all.”

He leaves his first adjective unexplained, the second implies an opinion of democracy he probably shares no more than does any other thinking man, but he gives no explanation of his third statement.

Canada is a young country, unweighted as it is unbulwarked, by tradition. If the conditions of our country are now such that we do not want a member of our legislature to represent a large and important part of our community who have voluntarily achieved the wider knowledge and experience involved by a university training, then it is time that those conditions should be changed.

Over fifty years ago John Stuart Mill wrote his opinion on this subject in his *Thoughts on Parliamentary Reform* where he said: "When all have votes, it will be both just in principle and necessary in fact, that some mode be adopted of giving greater weight to the suffrage of the more educated voter, some means by which the more intrinsically valuable member of society, the one who is more capable, more competent for the general affairs of life, and possesses more of the knowledge applicable to the management of the affairs of the community should, as far as practicable, be singled out, and allowed a superiority of influence proportioned to his higher qualifications. The more direct mode of effecting this would be to establish plurality of votes, in favor of those who could afford a reasonable presumption of superior knowledge and cultivation."

The thoughts of great men are generally true at any epoch and the above is as applicable to-day as the writer's famous statement: "If it is asserted that all persons ought to be equal in every description of right recognized by society, I answer, not until all are equal in worth as human beings. It is the fact that one person is *not* as good as another; and it is reversing all the rules of rational conduct to attempt to raise a political fabric on a supposition which is at variance with fact."

A more modern opinion was expressed by the Right Honorable Lord Hugh Cecil, M.P., who has represented Oxford University since 1910. He said that "the idea of representative government is that the representative body should be the whole people by representation, not as delegates or as ambassadors, but as being typical members of the community who, because they are typical, will reflect the mind of the community. If this be the true theory of representation," said Lord Hugh Cecil, "it surely needs little argument to show that the opinions and wishes of those who have taken degrees at a university are part, and an important part, of the general corporate mind of the people. Accordingly it is desirable that the universities should choose some members in the whole representative body to express the weight and influence of those trained in universities in the general life of the community."

#### *Not Class Representation.*

The most insidious and destructive argument used by the opponents of university representation is that it would be a *class* representation.

In Great Britain, where the expense of a university education prevents its wide diffusion, the argument might have a semblance of truth. In Canada, where such education is practically open to everyone willing to work for it, this association of ideas is ridiculous.

A clear and reasoned reply to the rather cheap and well-worn "class" battle-cry was given by Sir Martin Conway, M.P., the well-known traveller, explorer, and authority on art, who is one of the two members representing the modern English Universities of Durham, Manchester, Liverpool, Leeds, Sheffield, Birmingham, and Bristol. Sir Martin pointed out that it is unreasonable to speak of university representation in Parliament as being undemocratic, since you cannot divide the world roughly into two divisions of Capital and Labor. All human industry is like a tripod of which Capital and Labor are two legs; the third is Brains. Each part of this tripod is useless without the other, and in parliamentary representation the university element represents the Brains and is not in the least undemocratic. The university members do definitely represent an important section of the population and, not being very much biased by party considerations, they hold themselves free to represent in Parliament the purely intellectual energies of the country. University members are not usually elected on hard and fast political grounds. The vote is cast for the man rather than for the party. Once elected, their work is none the less useful because it is not done in the limelight. The university members are more in evidence in the committee room than in debate. Instead of indulging in vague generalities, Sir Martin gave me a definite example of one of the results of university representation. Not long ago the work-people engaged in some highly technical, scientific enterprise had a protracted argument with their employers as to rates of pay; the ordinary member would have had no special knowledge to enable him to give an impartial decision. The university member was able, by his expert training, to render valuable help in such a discussion, and a great deal of work which does not appear in Parliamentary reports is done by university members in regard to all questions concerning schools, education, museums, and science.

University seats are now never open for Government nominees; the members are elected by the method of proportional representation, and the voting is not by ballot, but may be done by post. Some of Sir Martin's constituents live in Canada.

Sir Charles Oman, K.B.E., M.P., the famous historian who represents Oxford University, has drawn attention to the fact that the representation of the universities is intended to give the opportunity for specialists in history, science, economics, literature, or even philosophy to give their advice to the great council of the nation. They do not stand for any party creed, but for knowledge. Is there anything undemocratic in asking advice of those who have special information?

*Independent of Parties.*

The second point made by Sir Charles Oman was that but for this method of representation the services of such eminent people as the Right Honorable H. A. L. Fisher, M.P., Minister of Education, Dr. Wells, Professor Larmor, and many others would have been lost to the nation, as none of them are wealthy enough to fight a large constituency, nor would they be ready to undertake the rough-and-tumble of party politics.

"It is an immense advantage," said Sir Charles, "that we need make no formal adhesion to parties, or subject ourselves to party discipline. We speak on the subjects on which we think we have special knowledge, but avoid political wrangles. The majority of us happen to be Conservatives, but it is not, surely, a reason for refusing us a hearing, unless democracy means a refusal to listen to arguments, which should not be the case."

The above opinion is reiterated by Dr. Adami, Vice-Chancellor of the University of Liverpool, who repeats that members over here are not elected as representatives of universities on political grounds, but definitely because of their high position and with the idea that they will be serviceable to the Government as consultants in matters of arts, science, and education.

"We seek," he said, "not to have strong politicians, but men who can be of service in the counsels of the country, very largely irrespective of politics, and it is most useful that there should be a means of entry into Parliament for men of this type."

Canada has, very rightly, paid great attention to the education of her people. Why then should she proceed to take away with one hand the consideration she gives with the other, and deprive her Councils of the benefit of the wider knowledge of those who would have no axe to grind but that of the advancement of their country?

We are all too apt to be easily influenced by catchwords without examining their worth. "Undemocratic" and "class representation" are glib terms which are dissolved into thin air by the merciless logic of the great man who wrote "if there ever was a political principle at once Liberal and Conservative, it is that of an educational qualification."—*University of Toronto Monthly*.

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*AS A MAN "ROPED."*

"There is nothing," says Mr. Butler, "that causes so much annoyance as debt, no matter how acquired. When you go into debt you tie a rope around your ankle and hand the end of the rope to another fellow, and whenever he wants to give the rope a jerk he can spill you on your face, and he knows it!"

# The Humanities of a Hospital Dental Service

BY A PUBLIC HEALTH NURSE.

OF all the "odd" bits of humanity that float through the St. Michael's Out-Patient Department, the very oddest and queerest, I think, is Granny Collins. Eighty-nine years she claims to have seen, and looking at her bowed form and her face, withered and brown as an old piece of parchment, one feels that she probably speaks truly. Evidently there is no age limit to coqueting, for "Granny" dyes her scanty locks, refusing to let Father Time fly his gray signal there. Years ago she lost all her teeth, and for a time that gave her no concern, but one day she came in to the dental clinic and asked to have new teeth supplied, so that she could masticate properly. (That is not just the way Granny expressed it.) She had no money and teeth cost money, so Granny was told that for the few years that remained to her she must keep on with soft diet. But, not for nothing was Granny born in County Armagh; she had the courage of her convictions and a persuasive tongue, and she haunted that clinic, declaring that life without a proper dental equipment was insupportable.

In sheer self-defence, we found a philanthropic soul who would pay for dentures and Granny was finally fitted out with a full complement of teeth. But, alas for Granny's digestion! Those gums had gone unshod, so to speak, for too many years to be cramped into shape with ivory shoes now. They refused to work with the teeth in place, so Granny must perforce remove the teeth to her pocket at meal times and wear them only when her mouth is at rest. She went to school only 1½ days in her youth, so that writing and reading, except for a few words, are not among her accomplishments. Consequently, she has never needed glasses. However, it came to Granny's mind lately that she was of an age now to wear glasses, so she came to Dr. Siebert's eye clinic complaining of eye strain. In all good faith, the Doctor tested her eyes and wrote out a formula for glasses. Granny informed him she had no money, but that the "City Nurses" had, so he came to us to see if we could help out in this case. We told him the story of the new teeth, and the only suggestion he could offer us was that we coax Granny to sell her teeth and invest the money in glasses. Up to date, she has refused to part with the teeth.

## Obituary

THE dental profession will regret to learn of the death of Dr. Edward Alfred Hill, of Sudbury, Ontario, on Saturday, 18th August, 1923, at Wellesley Hospital, Toronto.

# THE COMPENDIUM

This Department is Edited by  
THOMAS COWLING, B.A., D.D.S., Toronto

A SYNOPSIS OF CURRENT LITERATURE RELATING  
TO THE SCIENCE AND PRACTICE OF DENTISTRY

## SOME PHYSIOLOGIC PRINCIPLES IN ORTHODONTIA.

**I**N an address delivered by Martin H. Fischer, M.D., before the American Society of Orthodontists in Chicago, the following points were emphasized:

Aside from the question of infection there are dangers incident to the efforts of the orthodontist. We must keep in mind that the normal tooth is a living structure whose life is maintained through a proper blood supply, while the relationship of any tooth to the jaw is intimately associated with certain pressure effects which express themselves in bone absorptions and bone depositions in and about the tooth. In moving a tooth, there are two dangers. The first has to do with a possible strangulation of the afferent and efferent blood vessels bringing nutriment to the tooth; the other with the after-effects of the newly applied pressures between tooth and jaw. The pain suffered by patients after a too rapid movement of the teeth is too commonly the symptom of a strangulated blood supply and the death of a tooth pulp. If the resulting edema of the tooth pulp is not relieved, its death follows and the death of the central portions of the dentine also. If the strangulation has been brought about in a deciduous tooth, the eruption of its permanent successor is interfered with; if it has been brought about in a permanent tooth, there follows not only its discoloration but the half-dead tooth is brittle and its liability to secondary infection is very great.

Bone absorptions and bone depositions occur more quickly and more effectively in young structures than in older ones. Orthodontic procedures should therefore be initiated early. Individuals over twelve, and with increasing frequency as the years increase, rarely hold what has been won for them by the orthodontists. Even when gotten into better position, the necessary bone deposit needed to hold what has been gained is rarely obtained, and so in the course of a year or two the teeth slip back. In older individuals the number of strangulated pulps, and consequent half-dead teeth is enormously increased, and because of the so common superimposed infections present from the start, the number of serious systemic effects also. There is a danger in trying to move teeth too quickly and placing too great a pressure on isolated teeth which cannot stand it. A slow movement not only reduces the dangers of tooth strangulation but allows for

bone absorption followed by bone deposition without the hazard of bone necrosis invariably consequent upon excessive or too rapidly applied pressures.

Correctures which apply counter pressures to the jaws are always to be preferred to those which apply such to individual teeth, because the jaws can stand what a tooth, movable in its socket, cannot. Where teeth must be used it is best, obviously, to use several (as many as possible) as the base toward or from which a single other tooth is to be moved.

The turning of a tooth is more to be feared than monodirectional movement and the movement of a tooth through much of an arc more than the movement through a lesser one. For this reason it would seem better at times, to sacrifice a portion of that principle in orthodontic practice which tries to restore every tooth and both jaws to that absolutely normal alignment characteristic of the second set of teeth. The great amount of movement of many teeth and the great expansion of the jaw demanded in heavily undershot or overshot deformities might better be met by a partial sacrifice of this absolute ideal with its lessened dangers of strangulated teeth.

(For a complete report of Dr. Fischer's paper see *The International Journal of Orthodontia*, January, 1923.)

#### USE OF NICKEL SILVER LINGUAL WIRE.

IN a report from the clinic of The Dewey School of Orthodontia, attention is called to the use of Nickel Silver (German Silver) as a substitute, in orthodontia, for platinum alloys. Hard-drawn nickel silver possesses properties which renders it suitable for wire-stretching. In this respect it is very similar to iridio-platinum. The difficulty with the nickel silver is, however, that the temper is lost and it becomes too soft when soldered with hard solder. It is best to use soft solder when attaching the lingual wire to bands. Care must be taken to obtain a strong attachment between wire and bands, and this is done by using a liberal amount of solder. If an insufficient quantity of the soft solder is used, the attachment becomes weak and brittle. Of course this results in a bulky appliance and is a disadvantage as compared with the appliance constructed of iridio-platinum and hard solders. Frequently it is possible to so design the attachments by "wrappings," etc., that the strain on the soft soldered joint is reduced to a minimum.

It is the belief of this clinic that in cases where a fee cannot be obtained sufficient to cover the use of iridio-platinum, very satisfactory results can be accomplished with the nickel silver alignment wire. However, owing to the fact that when iridio-platinum base-wires and bands and hard solder are used a more delicate appliance can be constructed, these metals will have the preference in those cases where patients can afford to pay for the better appliance.—(Report published in *The International Journal of Orthodontia*.)



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713 St. Catherine St. East, Montreal

## ALBERTA.

AT the last session of the Alberta Legislature a Bill was introduced and assented to dividing the Province into Electoral Districts, for the purpose of rendering more equable the election of Directors of the Association.

The following is a list by districts of the members of the Board of Directors:

Edmonton District: Dr. A. B. Mason, Edmonton; Dr. Leslie McIntyre, Edmonton.

Red Deer or Central District: Dr. A. Aunger, Stettler.

Calgary District: Dr. A. E. Hennigar, Calgary; Dr. V. H. Macauley, Calgary.

Medicine Hat District: Dr. M. L. Moore, Medicine Hat.

Lethbridge District: Dr. L. T. Allen, Lethbridge.

Special Representatives: Dr. A. B. Mason, Representative to University of Alberta Senate; Dr. John W. Clay, Representative to Dominion Dental Council.

The officers of the Board are now as follows: President, Dr. M. L. Moore; Vice-President, Dr. V. H. Macauley; Sec.-Treas. Registrar, Dr. A. E. Hennigar, Herald Building, Calgary.

\* \* \* \*

IN July of this year, for the first time since 1912, a convention of the Alberta Dental Association was held in Calgary. Some seventy members of the Association and visitors from Saskatchewan and British Columbia attended, and the thanks of the local committees goes out to these men for their support.

The Association is greatly indebted to Dr. Arthur Black, Dean of the North-Western University Dental School, and Dr. Husten Methven, Professor of Prosthetic Dentistry, for their kindness in coming to Calgary and giving the whole of the four-day program.

Surgical treatment of Periclasia, with a number of clinical demonstrations of the same, was Dr. Black's principal subject. As Dr.

Mason, of Edmonton, remarked: "There will be a few miles of scalloped gum strip removed in Alberta in the next few months." Dr. Black certainly impressed those present with the value of such treatment, and it will no doubt find a place in our practice, more especially in the work on lower anterior teeth, and with reservations as to esthetics and facility of cleansing in other parts of the mouth as well.

A very sane discussion of the vexed question of root canal treatment, and focal infection, illustrated by lantern slides, and a study of the problem of making gold inlays that fit, made up the balance of Dr. Black's program.

Dr. Methven, by lectures and illustrations, went over the making of full dentures, going particularly into detail on the obtaining of compound impressions. His work on certain forms of partial restorations was also much appreciated.

From the opening of the meeting, with a very able address by Dr. Hennigar, the President of the Association, till the end, in the form of a brief farewell to our guests, including Dr. Black's son, who was of the party, the meeting was voted a success. Credit is especially due Dr. Hennigar, Dr. P. G. Atkinson, for publicity; Dr. Piper, for well selected and arranged quarters; Dr. C. B. Johnson, for entertainment; Dr. Macauley, for the program; Dr. E. M. Doyle, for efficiently taking care of the guests; and Mr. A. E. Sinclair, of the Ash Temple Co., who contributed a good deal to the success of the meeting.

\* \* \* \*

Dr. H. P. Barker, of Vulcan, was the winner of the Ash-Temple Cup in the golf competition. Dr. Maxwell had held this cup for the last two years.

J. W. C.

## Ontario Dental Convention, 1924

THE Ontario Dental Association is extremely fortunate in having the majority of the members of the Board of Governors in attendance at the American Dental Association meeting in Cleveland, September 10th to 14th.

Arrangements were made so that some member of the Board would attend each session in every department, in order that the entire program might be covered and the most outstanding essayists and clinicians selected for our next convention.

Your officers are attending this and other conventions at their own expense, in order to provide for the dentists of Ontario the best convention ever held in Canada. They realize that the time has come when the Ontario Dental Association must take a forward step, and feel confident that in arranging such an excellent programme they will have the support of the entire profession.

F. J. CONBOY.

# ORAL HEALTH

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TORONTO, SEPTEMBER, 1923

No. 9

## EDITORIAL

### The Navy Dental School of the United States

THERE was established early this year a Navy Dental School, connected with the Department of the Navy of the United States Government, for the purpose of furnishing post-graduate instruction in dentistry to officers of the Dental Corps of the Navy, and to train and to equip men of the Hospital Corps as assistants to dental officers. Instruction is given in two courses of four months each, commencing in February and September of each year.

The establishment of this school is claimed by its Faculty to be the result of a recognition of the value of dentistry in the Navy as a factor in assisting to preserve the health of the personnel, and an appreciation of the importance of furnishing the highest class of dental skill that the profession affords.

The school is excellently equipped with instruments and appliances for carrying on dental instruction, and its students have the benefit of instruction in the basic medical subjects at the United States Navy Medical School, which is in close proximity.

In connection with the school a prosthetic laboratory is maintained, to not only give instruction to officers and Hospital Corpsmen in this branch, but also is of value in caring for the needs of the naval service in regard to prosthetic appliances. The Surgeon-General has authorized the construction in this laboratory of crowns, bridges, artificial dentures, and all other appliances, to be furnished at Govern-

ment expense, at the discretion of the senior dental officer in charge, with a view to determining the total expense which would be involved in extending this class of dentistry to the entire service.

The operating clinic and surgical departments are similarly of value, both as a means of instruction and the rendering of much needed service in connection with the Naval Hospital.

There are 149 dental officers in the Navy, whose services are available to approximately 116,000 officers and men, which means that the service of one dental officer is available to every 778 men. At the present time no vacancies existing in the Dental Corps are being filled, as its strength is based on the proportion of one dental officer to every 1,000 men, though this is far below the proportion necessary to furnish the required amount of dental attention. This fact has been recognized by the Surgeon-General, who has already informed the Naval Committee that the proportion of dental officers should not be allowed to drop below the rate of one dental officer to every 750 officers and men.

The Dental Faculty of the school in arriving at an estimate of the number of dental officers the service needs, in order to carry on its present duty, and the additional work contemplated, consider that the proportion of one dental officer to every 350 officers and men would be none too large, though there are no reliable data or statistics available upon this point.

In this issue of *ORAL HEALTH* we publish a symposium of articles which have been written by officers of the Dental Corps of the United States Navy, and which are available to the dental profession through the official naval bulletin.

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### Classification of Dental Schools

THE Dental Educational Council of America issued a report, under date of July 1st, 1923, classifying the Dental Schools of the United States, placing twenty schools in Class A. group, fifteen schools in Class B., and two schools in Class C.

The following Dental Colleges were reported as having merged:

Colorado College of Dental Surgery, with Denver University.

Baltimore College of Dental Surgery, with the Dental Department of the University of Maryland.

College of Dental and Oral Surgery of New York, with the School of Dentistry of Columbia University.

#### DEAN CARR APPOINTED HONORARY DEAN

In the union of the C.D.O.S., of New York, with Columbia, extensive readjustments have been made in the Faculty, and Dean Carr, who has given excellent service for many years, has been relieved of active administrative duties and has been appointed Honorary Dean.

“Live to some purpose, make thy life  
A gift of use to thee,—  
A joy, a good, a golden hope,  
A heavenly argosy.” —*Coleridge*



C. N. JOHNSON, M.A., D.D.S., M.D.S.

*The honored Dean of American and Canadian Dentistry. Dr. Johnson was elected at the recent meeting of the American Dental Association as President of that body.*

# ORAL HEALTH

A JOURNAL THAT STANDS FOR THE "OUNCE OF PREVENTION," AS WELL AS THE "POUND OF CURE"

Vol. 13

TORONTO, OCTOBER, 1923

No. 10

## Dentistry in the British Army

By GEORGE CECIL.

### "BETTER LATE THAN NEVER."

PRIOR to the commencement of hostilities in South Africa, the military authorities did not consider qualified dentists as necessary to the personnel of a British Army in the field. When the war was in the second year, however, it was suddenly decided to send out a certain number of dentists to the Cape, and applications for employment in this capacity were accordingly invited. A selection from among those offering themselves was then made, and the successful candidates immediately embarked. That it was high time they did so was evidenced by the fact that by the date of their arrival in South Africa a considerable proportion of the troops engaged in active service were incapacitated from duty, owing to toothache contracted during the campaign on the veldt. When the conditions under which they fought—sleeping on the damp ground with scarcely any cover, and limited for months at a time to hard biscuits and indigestible trek-ox rations—are taken into consideration, it is not surprising to find that the men had trouble with their teeth. With the advent of the dentists, however, a change for the better speedily manifested itself; and, after these had got fairly to work, cases of admission to hospital on this account dropped to a trifling percentage.

During the late war, dental officers were attached to each unit, and proved a godsend to the troops.

### POOR SOLDIER.

Except when a campaign on a large scale is in progress, the condition of the British soldier's teeth does not receive much attention. Although it seems strange to say so, it is nevertheless a fact that dentistry forms no portion of the examination to which candidates

for commission in the Army Medical Department are subjected before receiving their appointments. While undergoing their preliminary training at Netley Hospital, after being admitted into the Department as probationers, they are given a short course of instruction on the subject; but this is of an extremely perfunctory nature. The natural result is that when the young and inexperienced surgeon is called upon to treat a soldier suffering from any complaint connected with his teeth, the methods he employs are extremely empirical. Sometimes they effect a cure; more often, however, the reverse is the case. This is certainly so when the damage is at all serious. Fortunately, in these instances the army doctor sometimes admits his inability to afford the sufferer any relief, and candidly advises the consulting of a civilian practitioner. This course involves the spending of a good deal more money than the private soldier can afford, and, as "free medical attendance" is distinctly promised as one of the benefits of enlistment, it should not be withheld.

Speaking generally, the average army doctor has only one method of treating toothache, namely—to extract. No matter what the cause, or what the condition of the patient's jaw, he endeavors to apply it. Such delicate operations as filling or crowning are entirely beyond him, as is also that of making artificial teeth. He has never learned how to carry them out, and is, as a rule, intelligent enough to refrain from attempting them. So far as this goes, however, it is doubtful if he would get a patient to submit to being experimented upon, for the average soldier has a decidedly poor opinion of the medico's skill in matters connected with dentistry.

In his methods of extraction the army doctor usually adopts those in force among the itinerant practitioners to be met with at country fairs. No anesthetic is ever administered; and the operation, consequently, resolves itself into a trial of strength between the forceps and the tooth. It is not to be wondered at, therefore, that a soldier suffers very severely before he voluntarily submits himself to the "dental" skill of a military surgeon. Indeed, he will endure untold agonies first, or cheerfully sacrifice a month's pay in order to consult a civilian dentist.

#### WANTED, TOOTH BRUSH SKILL.

A very great deal of the toothache and dental disorders generally met with in the British Army is directly due to the neglect and want of cleanliness displayed by the soldier himself in matters affecting his teeth. The use of a tooth brush is the exception, rather than the rule, in a barrack-room, for the class from which comes the majority of recruits have only a bowing acquaintance with this necessary article of the toilet. When a man has not brushed his teeth regularly before joining the army, he is not likely to acquire the habit of doing so afterwards. Various pains and penalties make it incumbent

upon him to clean his uniform and keep his equipment spotless; but, so far as his teeth are concerned, they may never see a brush from one year's end to another.

A fertile cause of toothache are the unsanitary conditions under which a soldier's life is sometimes spent. When in barracks, for example, he may have to live and sleep in a room which he shares with perhaps fifty or sixty others, his bed being placed against a window or a door, and thus affected by a constrict draught. The cubic space allotted to him, too, is condemned by experts as insufficient. Then, when on manoeuvres, the soldier sleeps in a tent, or else on the ground, his bedding being limited to a couple of blankets. If the weather be wet and cold, (as is the case for the greater part of the year,) he naturally sows the seeds of dental troubles innumerable, while even in fine weather this mode of living is apt to have an adverse effect on the teeth.

#### DIET AT FAULT.

It is, however, in the opinion of those who have studied the subject closely, the soldier's diet that is responsible for most of the dental troubles to be met with in the British Army. The food is not always palatable; it is sometimes indigestible; it is largely deficient in the constituents that make for nourishment; and finally, it is often prepared in a singularly unskilful fashion. The military cook, it should be explained, is, for the most part, as ignorant of the culinary art as a monkey is of mathematics. Prior to his enlistment he has never cooked a meal in his life; consequently, when he enters a regimental kitchen for the first time, in order to serve up his comrades' dinner, his views are exceedingly primitive. Even the preparation of the simplest dish is beyond his powers, and he either roasts a joint to a cinder or sends it to the barrack-room half-raw. Of course, after a little time he may improve; but, until he does so, the men upon whom his experiments are made suffer.

It must not be thought that no pains are taken by the authorities to remedy this condition of affairs. As a matter of fact, they do their best; but circumstances are too strong for them. An ex-laborer (which is the calling of the average recruit) cannot be converted into even a fifth-rate chef at five minutes' notice. Nor are there any means of according him proper instructions in barracks, and the appliances in the regimental kitchens are generally of so antiquated a nature that it is next to impossible to achieve good results from them. One non-commissioned officer in every battalion is a graduate of the Aldershot School of Cookery, and he is supposed to instruct the men placed under his charge. The supervision that he exerts, however, is of a more or less nominal nature.

#### BAD FOR THE TEETH.

When in camp or engaged on active service, British soldiers are

frequently given biscuits in lieu of bread. These biscuits, being exceedingly hard, are in themselves enough to ruin any jaw but that of a negro or an alligator. They bear, indeed, a close resemblance to chips of paving-stone, for which they would, no doubt, afford an excellent substitute. It is no great matter for surprise, therefore, that after living on these for a few days the unfortunate soldier finds his teeth causing him a great deal of trouble. On this account, presumably, the War Office has issued instructions that no recruits shall be accepted whose jaws are not in a perfectly sound condition. It has also been decreed that the possession of more than a certain number of artificial teeth shall be held as a physical disqualification. From the statistics published on this subject; it appears that several thousand men who would otherwise be eligible for enlistment are rejected by the medical authorities every year owing to the "bad condition of their jaws." This same test is also applied to candidates for commissions as officers. As, however, the class from which these latter are drawn are in the habit of attending to their teeth during their civilian days, the number of rejections among them on this account is comparatively small.

That the Royal Army Medical Corps doctor is ever likely to acquire more dental knowledge than he at present possesses seems unlikely. Nor is there any particular reason why he should, since his future rise of income is purely a question of promotion. And as the medico cannot avoid being promoted after a certain amount of service, he is, perhaps, wise in refraining from giving himself unnecessary trouble. At the same time, it is undeniably hard on the soldier that the care of his teeth is almost entirely neglected—although really a part of his promised "free medical attendance."

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## The Academy of Dentistry, Toronto

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THE Academy this year is planning for an interesting series of meetings at Osler Hall, commencing with Dr. Chappelle, of Buffalo, upon the subject of Full Dentures, on the evening of October 17th, 1923.

The study groups will again be an important feature of the winter's activities and arrangements will be made to concentrate upon studies in each section, thus completing them in shorter time and making it possible for members to attend more than one class.

A suggestion was made by the Montreal study club that Ottawa, Toronto, and Hamilton, co-operate with Montreal in bringing essayists and clinicians to these cities from more distant points. This suggestion may be acted upon.

W. G. L. SPALDING.

# Fiftieth Anniversary of the American Dental Society of Europe

*Paris, August 1st to 4th, 1923.*

J. WRIGHT BEACH, BUFFALO, N.Y.

THE Golden Jubilee of the American Dental Society of Europe was a notable event. It took place in Paris, August 1st to 4th, 1923, and brought together prominent dentists, representing several European countries, as well as the United States and Canada. We can, without peradventure, state that the bonds of professional friendship have been effectually strengthened through the happy relations resulting from this history conclave.

American dentists who have never enjoyed close fraternal intercourse with their European brothers can form but meagre conception of such refined cordiality and Old World distinctiveness. It was, indeed, a privilege to come into contact with the general cultural tone and the evidence of sympathetic co-ordination which prevails amongst the leaders of European dentistry. Words paint only the faintest shadow of this cherished, seasoned quality, which must be felt to be understood. One has an instinctive desire to emulate the possessor of this enviable quality when in his presence, and in consequence its influence is not only registered upon the consciousness, but it exerts a stimulating effect upon one's desire for self-improvement. This sidelight on the personal charms of the scions of our noble profession in the most progressive sections of Europe was much appreciated and valued by the writer.

To the regulation, home-trained American neophyte, the word "Paris" instantly flashes gay visions upon the drab screen of ordinary existence and plays hide and seek with a pretty little thrill up and down the fairway of his vertebral golf course, and even the hard-boiled and well frapped species, represented by the writer, has not become in the least immunized to these intermittent jumpspark shocks. This is an humble if, perhaps, uncalled for confession, but the conscience must be relieved on occasions.

All agree, however, that Paris is the original thrill dispenser, and those of us who have sat in the midst of a brilliant assemblage of our confreres, surrounded by the artfully conceived and delicately formed decorations of the French banquet room, have been conscious of a deep and subdued thrill of joy and satisfaction in being a small, though appreciative, part of such a delightful function.

Several such opportunities came our way in the nature of lunches and banquets given by the European Orthodontological Society.

the American Dental Society of Europe, the Paris Local Committee and the American Dental Club of Paris.

The "big" banquet on Friday night was a brilliant affair. The "President's Toast," by Dr. William L. Croll, of London, was a forceful and well chosen address, in which he evinced a wide range of the practical knowledge of dentistry and of the history of our profession. Dr. C. J. Mork, London, spoke on "Our Jubilee," and gave us an intimate word picture of the founders of the society, which took place at the Hotel Riga on July 4th, 1873. Dr. L. J. Mitchell, also of London, gave some very entertaining "Reminiscences of Our Society," in his own inimitable way. "Lou" is always the life of a gathering and he sparkled as brilliantly on this occasion as the bubbling "vin" in the crystal glasses, which sparkle was highly appreciated by those of us who had crossed the Atlantic Sahara to the privileged land, where grown men are not treated like truant school-boys and "Volstead ankalosis" of the elbow joint is an unknown malady.

Our own Dr. Truman Brophy spoke for "Our Visitors," and it seemed that he was as much a part of the European as of the American profession in his intimate acquaintance with the personnel of the dental fraternity, and the world of dentistry may justly claim Dr. Brophy as a most honored and beloved member. His talk was a medley of personal remembrances rich in interest and of great historic value. The "Exhibitors" were well represented by Mr. A. Pearce, who deeply sensed the compliment paid the dental dealers by being given an audience before a really International gathering of the dental profession.

"Our Centenary" was vividly portrayed by Dr. William S. Davenport, of Paris. The dental horoscope was turned on the future, and by a tactful play of transilluminators, X-rays and other scientific means of research, a very favorable prognosis was arrived at. As a purveyor of the facetious Dr. Davenport is supreme, and his remarks were thoroughly enjoyed. Dr. Davenport and Dr. George B. Hayes are two of the best and most favorably known dentists of Paris and Europe, and meeting them had for a long time been pleasurably anticipated by the writer. This opportunity proved to be a most enjoyable privilege of the meeting.

The writer must tell you of Dr. A. L. Hipwell, of Paris, Vice-President of the A.D.S.E. Dr. Hipwell is a graduate of the Dental Department, University of Buffalo, and we are in consequence justly proud of his splendid record abroad. He succeeded the late Dr. Daboli, and now occupies delightful quarters at 91 Champs Elysees, where he enjoys entertaining many noted members of the American colony whom he numbers among his closest friends. He is an officer of the American section of the European Aeronautical Society, and

because of his valuable service in this organization has recently had conferred upon him the much-coveted Legion of Honor by the French Government. Dr. Hipwell has also been very active in the Paris Chamber of Commerce. We hail him as the President-elect of the A.D.S.E. when the next session convenes at the Hague in August, 1924. His record reflects honor upon American dentistry, and particularly upon his Alma Mater. The great success of the Paris meeting was made possible through the careful planning and untiring efforts of a capable committee, of which Dr. Hipwell was an active member.

The meeting itself may be looked upon as a successful case of transplantation of an American program into Europe. The European Orthodontological Society, which convened on August 1st and 2nd, carried the names of Dr. J. Lowe Young, Martin Dewey and W. Hellman, of New York, and Dr. Beach, of Buffalo, also gave a short address. The program of the A.D.S.E. was well stocked with the following American names: Drs. Truman W. Brophy, C. F. Ash, A. H. Walker, G. W. Christensen, H. W. Gillett, J. Lowe Young, W. D. Tracy, J. W. Beach, Charles R. Turner, Herbert L. Wheeler, James P. Ruyl and William H. G. Logan. It is needless to make further comment upon the character of the meeting, for (with the sole exception of the writer, who is forced to display a bit of unnatural modesty) the list of names recorded above will carry to the mind of the reader a picture of the widest range of subjects under consideration by the dental world to-day. With the addition of eminent European dentists, including Drs. Doubleday, D. Hally Smith, W. M. Spaulding, A. H. Patterson, J. Lyon Williams and George Villain, you are given more than a suggestion of the well-balanced dental menu prepared for mental assimilation by our European confreres.

A notable feature of the meeting was the adjournment to the Arc du Triomphe, where an appropriate service was held over the grave of the Unknown Soldier. The conclave was saddened by news of the death of our beloved President Harding, which called for a season of silent invocation and heartfelt expressions of those present. Paris mourned with deepest sympathy, which gave us all a keener sense of our universal interests. Your correspondent has returned with a broader and bigger vision of human relationships, and with the conviction that we can help our European neighbors only to the degree that we can see through their own glasses and learn their needs through personal contact.

We cannot close without telling you of the real pleasure we experienced in shaking the hand of Dr. Fred Mallory, of London, formerly of Toronto. Fred is the same splendid fellow of former years, and is meeting with success in his newly-adopted home. Dr.

Phillip Dear, of Lausanne, Switzerland, is a newly-discovered friend whom we are happy to add to our list, together with many others acquired during our sojourn abroad. Dr. Harry Webb, of Syracuse, was an interested visitor, and gave a short clinic as an extra feature of the program.

Dr. E. D. Barrows, of London, is the new President, and extends a cordial invitation to his American brother dentists to join the gathering at the Hague next August, and gives the assurance that a great treat is in store for all who attend. We hope to meet you there.

For the first time in the history of the society, exhibitors were given space adjoining the meeting-room, and they were of an especially high order. Several of the leading American concerns were represented, as well as the leading ones of Europe. This innovation was most satisfactory to all, and showed the increasing tendency to work in close collaboration with the manufacturers.

A very pleasant surprise was given us by the visit of Dr. Eugene S. Talbot, of Chicago, who was sojourning in Paris and learned of the meeting. Dr. Talbot attended the banquet on Friday night.

The proceedings of the Paris meeting will appear in American Dental Journals.

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## The Dental Protective Association of Ontario

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THE following letter has been forwarded to each Licentiate of Dental Surgery in the Province of Ontario and it is expected that with such a nominal annual fee the committee will receive a prompt response from practically every Dentist in Ontario:

"The Ontario Dental Association and the Board of Directors of the R.C.D.S. have decided that some definite steps should be taken to protect the dentists of Ontario from unjust and malicious charges of malpractice with consequent court proceedings. In recent years these cases have grown to such an alarming extent as to prove a menace to the profession.

For some years the Ontario Dental Society has annually appointed an 'Advisory Committee,' whose duties were to give advice only in such cases referred to it by the dentists of Ontario.

It is now proposed to appoint a central '*Council or Committee of Advice and Defence*,' to which all such charges affecting the honor and reputation of the dentist might be referred.

The duties of this Central Council would be not only to give advice, but also to undertake to retain legal counsel and conduct

the defense of the accused practitioner in all cases, which in the opinion of the Council the dentist is unjustly charged.

Under such a plan if the dentist be threatened with a suit for damages for alleged malpractice he may refer his case with all particulars to the consideration of this Council. The Council will consider all cases as strictly confidential, and will go over the case in consultation with legal counsel, and if, in its opinion, the dentist is unjustly charged, will undertake the task of defending the case and pay all legal charges connected with such defense.

This will of course necessitate the establishing of central fund to which all participating dentists will pay an annual fee of \$3.00.

The Medical Association of Canada has had such a Protective Association in operation for more than 20 years and its annual reports show almost universal success in handling such troublesome cases.

The advantages of such a protection to the dentists are quite obvious:—

- (1) The case would be handled with a minimum amount of local publicity.
- (2) It would relieve the dentist of the anxiety entailed in working out his own defense against such charges.
- (3) It will largely put a stop to the numerous cases of blackmail brought against the dentist with the sole object of extorting 'hush money.'
- (4) Very many unjust and frivolous charges will dwindle away when confronted with such an organized defense.
- (5) If the case be taken to the courts the dentist will be assured he will be defended by strong legal counsel.

Such a Protective Association to be successful must be conducted on strictly judicial lines.

It must not in any year take on financial obligations beyond its resources.

The assistance of the Council shall be given only to those dentists who are entitled to such by the payment of the annual fee.

The Council will not be responsible for any legal fees or other expenses incurred without its written consent; and of course will not be responsible for any assessed damages the court may see fit to impose.

The members of the Council as at present constituted are Drs. Harold Clark, A. D. A. Mason, Wallace Seccombe, W. G. Thompson, R. G. McLean, R. G. McLaughlin (Chairman).

If you wish to avail yourself of the assistance and legal protection herein described, kindly sign the enclosed membership certificate, and return it with the fee of \$3.00. This should be mailed to Dr. W. E. Willmott, 240 College Street, Toronto, who will act as treasurer of this fund."

# The Necessity for Co-operation Between the Different Branches of the Medical Profession\*

By J. S. FRASER, M.B., Ch.B., F.R.C.S.E.

IN medicine, as in many other human activities, there is a conflict going on between the supporters of individualism and those of co-operation. The great medical exponent of the individualistic cause is Sir James Mackenzie, who appears to aim at evolving a sort of superman—the ideal general practitioner. It is just possible that if all doctors were Sir Jameses we might get within reasonable distance of this goal. Unfortunately, however, the bulk of the medical profession is not made on these heroic lines. I am not making an attack on Sir James Mackenzie, for I have the greatest admiration for his views. As he says, we have been engaged too much in demonstrating to students the advanced stages of disease; what we really should do is to teach them to recognize and combat the earliest signs of any deviation from a state of health. I do not, however, believe that future advances in medical science lie with the general practitioner, who cannot possibly know enough about all diseases to treat every case as it should be treated. (I remember that, while in general practice, I treated a case of glaucoma with atropin, with the result that the patient became blind in one eye). The general practitioner is often bound to feel that he is not doing the best that can be done for his patients. I hold that modern medical and surgical knowledge is too vast a field for any one man to cover and that the hope of progress lies in specialization and in the co-operation of specialists in the different branches.

What are the objections to this co-operative plan? Firstly, we are told that a specialist cannot see beyond his own specialty—that he thinks, if he be a rhinologist and otologist, that all cases of headache must be due to some nasal trouble or that giddiness can only be caused by a lesion of the inner ear. It may be admitted that there has been some ground for this accusation, but I maintain that the fault can be overcome by preliminary education, i.e., that a man must not specialize too early but must obtain first of all a good general knowledge of medicine.

The second great objection to specialism is that the efficient investigation of an obscure case may be a very expensive matter for the patient. Here, again, it must be admitted that there is some truth in the statement, at least as far as the wealthier 15 or 20 per cent. of the population are concerned. In regard to the 80 or 85 per cent. of the people who in this district come to hospitals for specialist opinions

\*Delivered in Edinburgh before the Odonto-Chirurgical Society of Scotland, March 9th, 1923. The Dental Record.

and treatment, there should be little or no difficulty. I say "should be," for as a matter of fact co-operation even in hospitals is by no means perfect—at least in my experience. We have not enough time for our hospital work.

Lawson Dodd points out that there are three stages of medical history: (1) In the first, medicine was closely connected with religion, the doctors were monks and hospitals such as St. Bartholomew's were originally monastic institutions. The healing art was something of a religious mystery. Medicine has passed this stage, though it is true that some of us still write our prescriptions in a kind of Latin and all of us use words of excessive length and mongrel origin to describe comparatively simple conditions. No, the real complaint against medicine is *not* that it is a mystery but that it is too much of a trade—that the commercial element bulks too largely in the outlook of the doctor. (2) This second or commercial stage, from which we are emerging—at least let us hope so—commenced with the barber surgeons. This quickly lent itself to quackery of the worst description. Patent medicines and cut-throat competition belong to this stage. (3) Long before 1858 and the passing of the Medical Acts, the practice of medicine was becoming a profession more or less.

### SPECIALISTS.

Consultants and specialists should form the elite of the medical profession. They should have the best brains, the highest skill, the greatest energy, and they are, at any rate to a great extent, a plutocracy. Hitherto it has been almost essential for a man who wishes to become a specialist that he should have money of his own or influence behind him, or, better still, both.

Most people now agree—the present Government represents a minority of the voters—that any boy in a primary school should be able, if he shows that he is worth it, to gain free admission to a secondary school, and further, that any boy in a secondary school, who has the necessary brains and application, should get a really free university education. I maintain that any graduate who is fitted for a specialty and wishes to take it up should be able to do so without calling on his parents to push him by their money and influence.

We must try to insure that the graduates who take up a specialty are those who really care for the subject. My experience is that, among every hundred students, two or three appear to be specially interested in otology and laryngology. These men spend their spare time during the session—and sometimes the morning hours of the vacation—at the ear and throat department in preference to going to the medical or general surgical hospital. The proportion indicated is just about the correct one between ear and throat specialists and the other members of the medical profession. It would thus appear as if

the choice of an otolaryngological career might be left to a sort of "natural selection."

In this country all that we have up to now expected of a specialist or consultant is that he should be more or less a gentleman and reasonably competent at his work. He need not do anything outside the routine work of the department to which he is attached—indeed, in the past he was often advised by his seniors not to push himself unduly, but merely to be useful and obliging. He was told to record an occasional case just to show that he was alive, and given to understand that he would in good time slip quietly into the position his senior would give up. I have heard a senior say: "It's all very well for a man to do original work when he is young, but the day comes when he is so busy with private practice that he has no longer any time for it." The senior appeared to look on this time as one of happy release, when a man could (mentally) sit back and rake in the guineas. It did not seem to occur to him that the junior might not altogether welcome such a golden age, and might regret that his time for research work was now very limited.

Is it any wonder that the young specialist comes to the conclusion that he had better take the advice of his senior? He knows that in ten or fifteen years the senior will have to leave the hospital, and that he himself will step into the senior's shoes. Meanwhile he has money enough to enjoy himself. He has plenty of spare time. He can join a club, play golf and bridge, or dance, and cultivate "consultant's tact," i.e., he can become an adept in the gentle art of cajoling the general practitioner. Of course, there are exceptions to this rule. There are men who have got on in spite of poverty and lack of influence, but not many. One—or even two—swallows do not make a specialist's summer. The fact is, however, that junior specialists and teachers should be adequately paid by the hospitals and university in which they work.

#### HOSPITALS.

I believe that the days of the voluntary hospitals are numbered. Patients should be treated because they are human beings and citizens and not because they are poor. I mean by voluntary hospitals to indicate charitable institutions supported by such things as flag days, house-to-house collections, or contributions dropped into the church plate or the big shell at the Caledonian Station. Such institutions have not enough money for adequate extension and proper equipment. In fact charity in medicine is an anachronism. Recent advances show the necessity for good bathing establishments, departments for massage and exercises, a dental department with a large staff, special departments for neurology, incipient mental disease, genito-urinary and orthopaedic surgery. Even with their present limited scope voluntary hospitals are in a bad state with regard to the question of beds. All

departments have long waiting lists. Further, it is almost useless to operate upon cases such as tubercular disease of bone, glands, etc., and to send the patients back to the slums from which they come.

There is a great lack of co-operation between the different departments. Some difficult cases may have to visit five or six different sections of an institution; they should take with them to each section a synopsis of their case history and a short note of the important things that have been discovered in each department which they have visited. Suppose we take three symptoms which concern my own specialty, symptoms which, in the first place at any rate, would come under the notice of the general practitioner. Firstly, *headache*. For the proper investigation of a case of intractable headache we may require the cooperation of the internist, neurologist, oculist, rhinologist, and possibly also of the radiologist and bacteriologist. Secondly, *hoarseness*. The laryngologist would of course be required, and, if paralysis of the vocal cord was found, an internist, a neurologist, a radiologist and possibly a venereal disease expert. Thirdly, *giddiness*. Such a case should be seen by an otologist, an internist, a neurologist, an odontologist and an ophthalmic surgeon.

I remember hearing a paper by the late Professor Francis Boyd on the collective investigation carried out by the R.A.M.C. in Egypt on pellagra among Turkish prisoners of war. This was a splendid example of team work. Some eight or ten men were put on to investigate the subject. They met together at frequent intervals, made interim recommendations, and eventually arrived at certain conclusions. Their work resulted in the stamping out of pellagra.

A large hospital should have a central waiting-room to which all patients are admitted. Opening off this there should be doors, leading to the various out-patient departments and examination rooms—medical, surgical, gynecological, eye, ear and throat, dental, skin, venereal, X-ray, neurological, genito-urinary, etc. In this way it would be an easy matter for a patient to be referred to several different departments when necessary. At the present time it involves a walk of about three hundred yards for me to take a patient over to the electrical or the surgical out-patient department for an opinion.

Hospital staffs are not large enough. Patients are kept waiting far too long. By the end of a waiting day the medical or surgical staff is often tired and jaded before the last patient has been seen. Further, there is no system for following up cases which have left hospital so that the physician or surgeon often cannot ascertain the after history of his patients. The whole thing is not properly thought out. I believe that the best way would be to organize hospitals under the big Municipalities and County Councils. The State is really too big and too distant to efficiently supervise these institutions. In the future those hospitals which have a whole-time staff will prove themselves so

superior to others that the voluntary hospital, with its "part-timers" will be frozen out. For teaching purposes there should be close co-ordination between the university and the teaching hospitals.

Lord Dawson by no means believes in an entirely whole-time hospital service, but even he advocates that a man should be a whole-timer for the first five years after he gets on to the hospital staff, and that he should during this period give himself up to teaching and research. Personally I do not envy the feelings of such a man when, at the end of five years, he has to enter the scramble for private practice; what is more, I do not believe he will do it but will insist on being allowed to continue the method of work he has learned to know and enjoy.

Just think of the work of a hospital surgeon. In the morning he may, if he is lucky, have a private operation or two to perform at a nursing home; then he has his hospital work, treating patients and teaching undergraduates; he then comes home rather tired and hungry and gulps down a little lunch before seeing his private patients. When the consultations are over there are numerous letters to write to doctors who have sent patients to the hospital or to the surgeon's house. It thus becomes impossible for him to do any scientific or research work, and very difficult to keep himself abreast of recent literature. If the surgeon is a married man with a family, he has little or no home life. My own notion of the ideal day would be that the surgeon should go to hospital say at nine or half-past nine and there see not only his public but also his private patients. This would take till one or half-past one. He should then have an hour's interval for lunch. After that he could do his laboratory or clinical research work or take part in post-graduate teaching. He ought to get home at about 5 p.m., and have time for some family life. In the evening he could read up recent literature or amuse himself.

I think that clinical and laboratory research should be placed on an absolutely equal footing. It is absurd to pretend that everybody is fitted to do laboratory research. In many ways good clinical research is the more valuable of the two.

#### PRIVATE PRACTICE.

With regard to treatment by consultants, the middle classes, especially the lower middle classes, are worse off than anybody else. The wealthy classes can afford to go to numerous specialists and obtain the opinion of each one upon their case. Even this is not ideal, because the patient when visiting a particular specialist lays most stress upon the symptoms which he thinks will be of interest to that specialist. This is where a good letter from the patient's private doctor is of the greatest value. The doctor should be able to indicate to the specialist the results of previous examination and treatment. The poorest classes, on the other hand, have the general hospitals to go to. The lower middle

classes fall between two stools. They cannot afford numerous "private" consultations, nor do they care to go to charitable institutions. The best solution of all would be to have only one hospital, a general hospital with paying wards attached to each department, as in America. All difficult cases should be sent to the teaching hospitals for consultation, but, for some years at any rate, it would be necessary to see private cases at a different time and place to those occupied by the examination of the other hospital patients. An arrangement like this would enable private patients to get the best appliances—a thing they do not get at present in private nursing homes. Of course, until we have a whole-time medical service private patients would have to pay a consultation fee just as they do now. The fee itself could be graded according to the patient's income.

In Edinburgh we have far too many little nursing homes which are not economic units but are run under the system of so-called "private enterprise." As a rule they belong to a nurse (who may run herself into debt to start with) and only contain ten to fifteen beds. Each requires a matron, cook, scullery-maid, one or two housemaids, and several nurses. The large institutions relatively require much fewer attendants. The little private nursing home has no proper scientific equipment and may be compared to the little "one man" shops that form such depressing rows in many of our streets.

#### THE DIAGNOSTIC CLINIC.

Halsted, of Syracuse, U.S.A., points out that a few years ago most of the patients who consulted a specialist were referred to him by their own family physician. Now the great majority come of their own initiative. The result is that frequently a patient consults a number of specialists in different branches, each for the relief of a different symptom. The specialist is handicapped through his lack of knowledge of what is present in other parts of the body. He often mistakes cause for effect and *vice versa*. There are a certain number of obscure cases which the most intelligent general physician cannot diagnose. He must therefore refer his patient to at least one and frequently to several different specialists, only then to fail in reaching a diagnosis because the right region has not yet been investigated. The general practitioner receives reports from all the specialists. The reports are clear but the individual specialists never get together, and consequently no one of them ever sees more than a small part of the whole picture, while the family physician fails to grasp the significance of much of the information supplied him. Thus discredit is brought not alone upon the individual examining physicians but upon the profession as a whole. It is for the profession to devise a means for correcting this very grave fault in diagnosing this class of case. Team work is of course the essential feature of any plan. Halsted sketches out the work of a

diagnostic clinic and of the "group system" as follows:—

Retention of a specialist in a "group" depends entirely on the individual's efficiency, faithfulness and honesty in doing his assigned work, because every member of the group becomes vitally interested in the quality of the work, his individual reputation being involved with that of the others. The organization consists of two main groups, A and B, each serving on alternate months, and a third group, known as the auxiliary group, made up of certain specialists whose services are not required in every case. In each of the main groups there are eight men, viz., general medicine (two), one each from general surgery, gastro-enterology, orthopaedic surgery, ophthalmology, oto-laryngology and clinical pathology and bacteriology. In the auxiliary group are neurology, proctology, urology, gynecology, dermatology, odontology, pediatrics and obstetrics. The services of any of these men are available in any case in which the group chairman thinks such service desirable. Experience may demonstrate the wisdom of adding some of the departments of the auxiliary to the main group. Each group, A and B, selects its chairman, who is responsible for the history of the case, and is the first one to see and examine the patient, after which he arranges, through the supervising nurse, for the visits of the other members of the group, together with such members of the auxiliary group as he may desire. The supervising nurse is a trained nurse, who can use a typewriter. She has to deal not only with the patient and the physicians of the group, but she also manages the bookkeeping and financial end of the work. She sees that all specimens are sent to the laboratory, arranges the details of the physicians' visits, is present at every examination, takes notes and typewrites them. She also attends the general consultation, where she takes the minutes. The laboratory member of the group is responsible for the examination of the blood, urine, faeces, cerebrospinal fluid, the routine "Wassermann," the tuberculin test, the test meal and any other special laboratory work, including microscopic examination of tissues and bacteriology. After all examinations, clinical and laboratory, have been completed (three days to a week) a general consultation of all who have had to do with the case is held, and if possible a diagnosis arrived at; the physician who sent the case is urged to attend and participate in this consultation. The discussion may show need for further investigation, and if necessary a second consultation takes place. A typewritten statement containing the conclusions of the clinic, the individual findings of the different examining physicians, together with such suggestions as to treatment as may seem advisable, is sent to the patient's physician. A second copy goes to the patient or his responsible relative, a third copy being retained in the files of the clinic.

Only patients sent by their physicians are received for examination, and then only for the purpose of diagnosis. Suggestions as to treat-

ment are made when they are asked for or when it seems desirable. *Only cases that are obscure and complicated are accepted by the clinic*, which reserves the right to decline any case which is unsuitable in the opinion of the chairman of the group. A flat fee is charged, the minimum being fifty dollars (about £10) and graded upwards, according to the patient's financial situation. In addition the hospital charges its regular room rates for time occupied. The fee is finally divided equally among those who have examined the case, to be retained by them individually or given for the purchase of new equipment for improving the service of the clinic. Halstead adds that in rendering this service the members of the clinic themselves acquire much knowledge and benefit greatly by the consultations with their colleagues. The hospital itself is improved by the steadily increasing efficiency of its staff and takes a pride in keeping the laboratory and other equipment up to modern requirements.

My own opinion is that efficient co-operation between specialists over a difficult case entails the necessity for a chairman or director who will preside over the meetings of the various specialists engaged in each case. He should have an equable temperament and a well-balanced mind, but must be able to exert authority when necessary. He will be in the position of a judge who has to sum up on the evidence presented to him.

#### CONCLUSION.

I believe in a public medical service supported by a health rate after the analogy of the education rate. Health is even more necessary than education. Sir Robert Philip once told me that it had been calculated that a health rate for Edinburgh would only amount to 4*d.* in the pound. At the present time the Royal Infirmary receives every year a splendid contribution from the miners, amounting, I understand, to about £14,000. I maintain that this is in the nature of a hospital rate and forms a much sounder financial basis for the institution than charitable offerings.

"Prevention" should really be the watchword of the future. We must not wait until a patient has a cavity in his lung or has got cardiac dropsy, or has had a severe haemorrhage from a duodenal ulcer before treating him. If I may paraphrase Shakespeare I should like to suggest a new edition of the various ages of man as regards treatment. (1) Treatment before birth, in antenatal clinics. We now know that a case of congenital syphilis should be treated through the mother. (2) The infant and "toddler" should be attended to through child-welfare centres, dispensaries, sick children's hospitals and such institutions. (3) The schoolboy should be examined by the school medical officer and, if necessary, by the various specialists attached to the school clinic. A certain amount of treatment can be carried out at the school clinics. For institutional treatment the schoolboy would

have to go to the sick children's hospital or the infirmary. (4) The adolescent and adult would be attended to under the Health Insurance organization. Each person from the earliest years should have a dossier, so that at a glance the doctor or specialist may be able to see the past medical history of his patient. For serious or obscure troubles adults would of course go to the general hospital.

We already have a good beginning of a public medical service, e.g., the public health service with the sanatoria for consumptives, and Naval and Military Medical Services, the Local Government Board, the Board of Control and the Asylum Service, the School Medical Service. All these are very largely, if not entirely, staffed by whole-time men and women.

The individualists, the capitalists, the "private enterprise" people, make great play with the theory that no man will do his best unless he has the incentive of private gain, i.e., of trying to make more money than the next fellow. I absolutely deny this. As Lord Haldane said at the time of the Coal Commission, there are plenty of men of the type who will do their best work for fame alone, granted that they are given adequate salaries. There are "whole-time" professors of anatomy, physiology and pathology. Do they not do their best? Are they not as good as the "part-time" professors of clinical subjects?

A public medical service will require time, and no doubt at first it will be far from perfect. When motor-cars came in they were clumsy, ugly and inefficient. The motor engineers did not even know where to put the engine, they could only think of motor-cars in terms of the old carriage or dog-cart. In the same way we can hardly as yet think of any other method of doing things in the medical world than on the old lines with many general practitioners and a few specialists, with much individualism and little co-ordinated effort.

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### Obituary

ON Monday, August 27th, at Rochester, Dr. Stewart J. Burns, of Regina, passed away. The late Dr. Burns was born at Sydney, Nova Scotia, where he received his early and secondary education, and matriculated at Dalhousie University in the faculty of medicine.

After completing one year there, he went to South America for some time, later returning to Philadelphia, where he took a part of his dental course.

In 1912 he came to Regina and opened a dental laboratory and later articulated as a student of dentistry with the Saskatchewan College and was associated for a time both with Dr. Irwin Robb and Dr. W. D. Cowan.

Upon completion of his course, he opened an office in Regina, where he has since successfully practised his profession.

C. W. PARKER.

# Chronic Infection of the Jaws: Predisposing Causes and Principles That Govern Treatment

By STANLEY COLYER, M.D. (Lond.), D.M.R.E.

Radiologist to the Mildmay Mission Hospital; late Asst. Radiologist to the Royal Dental Hospital.

THE radiological diagnosis of chronic infection of the jaws has closely engaged my attention during the last three years. I have also, though with less thoroughness, studied the question from the etiological and therapeutic points of view, and it is with these that I propose dealing in this communication. The subject of jaw infection is an old one, and is generally referred to under the title of "oral sepsis." It is manifest, however, that this term oral sepsis, rivets the mind too closely upon the superficial parts of the mouth, and as a consequence it is too often forgotten that though the infection may occasionally be superficial, it is as a rule distributed, to a greater or lesser extent, throughout the deeper tissues of the jaws. Oral sepsis includes a disease known by various names such as pyorrhoea alveolaris, chronic general periodontitis, alveolar osteitis, and so on. Of these names alveolar osteitis appears to me to be the most suitable, but it does not express the condition when the infection has spread beyond the limits of the alveolar processes, nor does it direct the attention to the mucous membrane or the teeth. Chronic general periodontitis is obviously a bad term, as it does not include the infection of the supporting bones of the teeth which is invariably present. Pyorrhoea alveolaris—to use the most popular name—when established is a chronic inflammation of the mucous membrane about the necks of the teeth, of the periodontal membranes, and of the supporting bone. It is for these reasons that I prefer to use the term chronic infection of the jaws. With these remarks on the nomenclature of this important disease, I turn to discuss certain predisposing causes by which it is brought about, kept up, or intensified.

The sources from which infection of the periodontal membranes and the bones of the jaws may come may be divided into:—

- (1) Surface infection from the gums.
- (2) Deep infection via the apices and root substances of teeth with infected or dead pulps.
- (3) Systemic infection from a source outside the mouth.
- (4) Forcible regulation of teeth.

(1) SURFACE INFECTION—Practically all civilized adults suffer in some degree from a marginal gingivitis. The same statement is true of large tribes of natives with whom I lived for many years in

Central Africa. It is from marginal gingivitis that the periodontal membranes and the alveolar border is first infected, and it is from them that the infection spreads to the deeper aspects of the bones.

Now it does not follow that because a person suffers from a mild gingivitis he is necessarily bound to develop chronic infection of the bone, although it is almost certain that as time goes on some degree of infection will result. It is probable—and there is experimental evidence in favor of the view—that normal mucous membrane of the mouth allows germs to pass through it into the general circulation, so it is fair to assume that when a gingivitis occurs that we have the condition established which has been described by Adami as “sub-infection.” In the normal passage of germs through the mucous membrane it seems that, owing to their number and quality, the body cells are able to deal with them without damage to themselves; but in sub-infection the increased number and no doubt also their increased virulence causes in time damage and degeneration of the body cells whose business it is to combat with them. The effects shown upon the deeper structures of the jaws will thus depend upon the degree and duration of the infection and upon the resistance of the patient. It is essential to keep in mind the resistance of the patient. It is a very real factor, and one which depends not only upon the natural resistance of the patient but upon many adventitious circumstances. Thus it is unquestionable that prolonged illnesses, too frequent child-bearing, and other exhausting conditions may so diminish resistance that a hitherto comparatively harmless sub-infection from the gum margins may lead to a definite infection which establishes itself firmly in the deeper tissues of the jaws. Broadly speaking, one or two states may follow this infection: the resistance of the patient may increase, in which case reparative changes in the tissues follow, or the resistance may remain low, in which case reparative changes may to a large extent be absent, and destructive changes may extend. The second is the unusual result: in it the tissues have become a definite source of infection, and the patient may in consequence be profoundly ill. Radiographically in typical cases the evidence is definite. In the infected and unhealed jaw the radiograms are dull and often hazy, the *laminæ duræ* may be absent or broken up, and faint areas of ill-defined rarefaction may be found scattered throughout the tissues. In the infected and more or less healed jaw the radiograms are clear, haziness is absent except, perhaps, a bright haziness due to sclerosis, the *laminæ duræ* may be broken or they may be thickened. I wish to emphasize the existence of these extreme types, though it must be remembered that between them numerous less defined types exist, because upon the diagnosis of the conditions present depends the principles that govern treatment.

We can now, without wading too deeply into the troubled

waters of etiology, consider some of the predisposing causes of marginal gingivitis.

(a) *Mouth breathing.* There is no question that mouth breathing, which dries the mouth and inhibits the flow of saliva, leads to a stasis of debris of all kinds in relation to the teeth and gum margins, and this leads to a marginal gingivitis. The gingivitis resulting is mainly limited to the upper and lower front teeth.

(b) *The presence of painful teeth.* Teeth which are painful are thrown out of action, and this leads to a local stasis of food and other debris, which in its turn leads to a local gingivitis.

(c) *The presence of crowns, bridges, incorrectly filled teeth and dentures. Crowns and bridges.* The fitting of crowns, either alone or in conjunction with bridges almost certainly necessitates damage to the tissues about the cervical edge of the teeth in question, and unless the band which embraces the neck fits accurately (which it very rarely does), the sharp edge causes an oft-repeated damage to the neighboring soft tissue. This is the usual condition. But the crown may have been well fitted and damage to the tissue at the cervical edge may have been trivial. How then? Let us assume for a moment that the crowns are well fitted and we can then deal with the roots in a more simple fashion. Crowns are fitted to living or dead teeth. The latter may either be teeth that the dental surgeon has devitalized, which operation may have been carried out on a perfectly healthy pulp or one that is infected; or the dead tooth may have originally contained a dead and putrid pulp. Bearing these different types of roots in mind, my radiographic experience (which is obviously partly based upon an imperfect knowledge of the condition of the root at the time of crowning), is as follows: Crowned living teeth may remain in good condition for many years, at least twenty-five; but crowned dead teeth have a far more limited harmless life. A crowned tooth the pulp of which has been killed will last longer than one in which an attempt has been made to sterilize the effects of a putrid pulp. Of these dead teeth the former seems to be able to last comparatively harmlessly for about ten years, after which a slow absorption at the apex begins, whilst the latter, the originally putrid teeth, seem to go wrong in a very short time. Probably the same happens to dead teeth, whether crowned or not. If, however, the crowns have been badly fitted, it is clear that infection of the roots will occur rapidly. A crown or bridge *per se* is not necessarily a harmful contrivance; the result depends upon the skill with which it is fitted and the condition of the roots that are used as supports. My remarks refer to crowns in a healthy mouth. It is hardly necessary to add that crowns should not be fixed in a mouth suffering from pyorrhœa alveolaris.

*Incorrect fillings.* There is no need to explain the means by

which incorrectly adapted fillings lead to local infections of the jaws.

*Dentures.* Of all local predisposing causes of gingivitis and consequent jaw infections, partial dentures are perhaps the most important. I have seen many mouths ruined by them. To show what I mean, let us consider a case of pyorrhœa alveolaris (I use the term as it is understood and because it does not include the word "general"). This disease, though as a rule general, may be much more advanced in one part of the mouth than in another. In such cases even the best parts of the mouth, though showing no marked periodontal trouble are almost invariably affected with a definite marginal gingivitis. Let us suppose that the treatment of the molars except by extraction is considered hopeless, and that an attempt is to be made to cure the rest of the teeth by local measures. The molars are extracted, and in a few weeks plates are inserted. Now, if those plates cover the mucous membrane at the cervical edge of the teeth, almost certainly there will be an exacerbation of the marginal gingivitis and an increased infection of the periodontal membranes will follow, and this will cause the disease to run a more rapid course than it would have done if plates had not been inserted. I admit that with extremely careful patients such an unfortunate result may not occur, but the majority of patients are far from careful. My argument is that plates should be inserted only when absolutely essential, and that they should be so designed that the gum at the cervical edge of the teeth is left uncovered. Only under such circumstances can one reasonably look forward to a practical cure of the infection in the remaining teeth. I am aware that a small minority of practitioners long before this paper was conceived have realized the importance of isolation of the gum margin and have designed their plates to that end and to the lasting benefit of their patients. Although the example I took was of a patient suffering from pyorrhœa alveolaris, even in one with a comparatively uninfected mouth a covering plate may soon produce the undesirable infection of the gum margins and of its related tissues.

One further word before I close this section, and that with regard to the distribution of jaw infection in cases of pyorrhœa alveolaris. The maxilla is far more likely to be diffusely infected than the mandible. It follows that in cases showing general symptoms if one wishes to clear up the infection of the maxilla, it is frequently necessary to clear it of its teeth. In the mandible, on the contrary, the infection is more localized and it will often be found possible to justifiably retain some of the teeth.

(2) DEEP INFECTION VIA THE APICES AND ROOT SUBSTANCE OF SEPTIC TEETH.—This source has to a large extent been dealt with above and here requires but little further discussion. Any septic tooth will certainly cause infection of the tissues in which it is

implanted. It thus follows that its removal does not mean the removal of all infection, for the infected supporting structures are left behind to be dealt with by the body. Under suitable conditions the infection in time disappears, but under unsuitable it remains, and may, if it has not already done so, spread to neighboring periodontal membranes. The importance of the spread of infection in the deeper aspects of the jaws has not yet been fully appreciated, nor has it been realized that the roots of permanent teeth are possibly at times infected from a residual infection, due to septic milk teeth, long since removed. I believe that many cases of general troubles arising in young adult life will in time be traced to original infection from the milk dentition. There can be no question about leaving septic teeth in children's mouths. Twenty years ago I wrote that the best work a dental surgeon can do for children is "to carry on a relentless war against their septic mouths." I repeat those words to-day with the conviction that an increased experience has given me.

(3) SYSTEMIC INFECTION FROM A SOURCE OUTSIDE THE MOUTH.—That infection of the jaws may occur from a general bacteræmia must be allowed. But the proof has yet to be brought forward, and this is made most difficult, as the local sources of infection are so many that it is difficult to exclude them. There are, however, certain cases which have caused me much thought. I refer to those peculiar cases in which a number of teeth are affected by an excementosis. The teeth in such cases are often apparently healthy and the mouth may be exceptionally clean. Not infrequently the patients are the subject of a streptococcal infection, and suffer from various types of fibrositis. It is known now that the different types of fibrositis are due to localized or occasionally generalized infection of the fibrous supporting structures of the main tissue in question. In some cases small masses of fibrous tissue, so-called "nodules," are formed, which may at times be clinically diagnosed. It seems to me possible that the conditions that give rise to these fibrous nodules may also give rise to excementoses, and even to pulp stones. It is merely a suggestion and one that will take long observation to prove or disprove.

(4) THE FORCIBLE REGULATION OF TEETH.—I am impressed by the at present irreparable damage that may be done at times to a mouth by the forcible or mechanical movement of the teeth. It does not appear to be due to the mere covering of the mucous membrane by a plate, as some of the cases I have seen have followed treatment by the so-called "fixed apparatus." Rather it seems to be due to an actual damage done to the cancellous tissue, whereby its resistance is lessened and the way opened to infection. In extreme and obvious cases there is in addition to other appearances a well-marked absorption of the apices of the teeth, but in other less marked

though severe cases there is a general infection of the teeth and supporting structures. In order to recognize the latter cases, one must be able to diagnose the less obvious forms of jaw infection—a subject which I cannot enter into here, but about which I hope to write in the future. In the meantime I can say with certainty that the forcible regulation of children's teeth may lead to most disastrous consequences, and from a radiologist's point of view I unhesitatingly condemn the method.

The above, in my experience, are the most common predisposing causes of chronic infection of the jaws. Their prevention is so obvious that it is unnecessary to discuss this aspect of the subject. I therefore pass on to consider in broad outline the principles that govern the treatment of this very important disease.

In commencing this short discussion on the principles that govern treatment, I assume that other sources of infection have been excluded, or, if not excluded, that the treatment of the jaws is considered necessary. The basis of treatment depends upon three main principles—the first being that of correct diagnosis, the second being the knowledge of reparative changes, and the third being the importance of reinfection.

(a) *Correct diagnosis.* Elsewhere I have dealt shortly and somewhat incompletely with the radiographic changes which occur in the deeper tissues of the jaws, due to bacterial infection. These changes are by no means always easy to be sure of, and it is obvious that where diagnosis is to be made by slight alterations of shadows that differences of opinion even among the most expert must sometimes arise. It is necessary therefore to have some means by which the diagnosis of the radiologist can be checked. One method is to remove one or more doubtful teeth, and to examine them both macroscopically and bacteriologically. Another method is to take a scraping of bone from the side of the tooth socket immediately after extraction. A third method—and one that seems the most scientific—is to turn back a layer of muco-periosteum and trephine out a small piece of suspected bone, and submit it to bacteriological examination. This last method has been followed three times in my own cases. From the first case a streptococcus was obtained; from the second a staphylococcus; and from the third—a case of persistent shrinkage of the jaws, which radiographically showed obvious infection—a mixed growth of streptococcus and staphylococcus was obtained two years after the extraction of all the teeth. This last case suggests strongly, as I anticipated, that persistent shrinkage of the jaws is due to a persistent residual infection. Such methods are sufficient to settle a doubtful diagnosis.

(b) *Reparative changes.* It is absolutely essential to realize that reparative changes, both local and widespread, do occur, though the

cures brought about by whatsoever method can be regarded as partial or practical cures only, for so far as I can judge, in a case of any severity the cure is never complete and the altered tissue is in a condition of lessened resistance. My evidence of such partial cures is, that some will remain well until advanced age, but that the majority begin to break down at the age of commencing atrophy, about forty-five, and that when breaking down begins it will occur with unusual rapidity and further treatment will be of but little avail. To a large extent the maintenance of a partial cure is in the hands of the patient and depends upon scrupulous cleanliness.

To estimate reparative possibilities, it is necessary to have in mind a clear picture of the pathological condition present, its destructive results, and the reparative changes, if any. Also of great value is a knowledge of the patient's age, sex, general condition, and of the possible influence of the therapeutic remedies at our command. Co-related diseases, if present, will of necessity influence treatment.

(c) *Re-infection.* The chronically inflamed tissue about the necks of teeth must be regarded as open wounds, through which re-infection of the deeper tissue is constantly occurring. In this connection it should be borne in mind that the lymphatics from the outer side of the papillæ and from the gum surface pass along the periosteum of the bone and join those from the lips and cheeks; whilst those from the inner surface of the papillæ penetrate the dental ligament and pass down through the periodontal membrane to the neighborhood of the apices of the teeth, where they join the lymphatics from the pulps and pass on to anastomose with the lymphatic network in the bone (Noyes and Dewey). It is thus clear that for the successful treatment of deep infection it is necessary to close these ports of microbial entry. It is this difficulty in closure that makes the local treatment of jaw infection difficult, and, perhaps, at times, impossible.

Bearing these facts in mind we will now consider in broad outlines certain methods of treatment.

*Method One.*—*Closure of the ports of entry of germs by local treatment, thereby preventing re-infection of the deeper tissues.*

There is no question that in the early stages of jaw infection, when damage appears to be limited to the gums and the alveolar edge, that ordinary local remedies used by dental surgeons can bring about a sensible amelioration or even a practical cure of symptoms, both local and general. And if the patient subsequently follows a strict oral hygiene the cure may be maintained.

Local treatment in early cases seems all that is necessary, but should the patient be suffering from a toxæmia, an anæmia, or such like condition, such treatment must be combined with more general remedies. I am satisfied, though I cannot yet be certain, that even the diffuse infections of the jaws, accompanied by severe general con-

ditions, do occasionally, under local and general treatment, recover to a large extent. In these latter cases, however, the chances of recovery would be increased by a reduction of the mass of infection (q.v.).

*Method Two.—Enhancement of the resistance of the patient by means of vaccines.*

By means of vaccines, it is hoped to raise the resistance of the patient, thereby bringing about a more rapid recovery, or even initiating recovery in tissues otherwise incapable.

This is a method which has been given an extensive trial over many years, and, so far as this particular disease is concerned, it does not appear to have justified itself, nor do its exponents seem to have produced unequivocal evidence of its value. A large number of patients who have received vaccines from bacteriologists, many of whom were acknowledged masters of the specialty, have passed through my hands. The cases I see are, of course, the failures, and though these are the only ones I have seen I do not wish to suggest that there are no successes. Some of these cases had been treated for simple "pyorrhoea," others for that disease plus some complication. The usual history obtained is that the patient at first felt better; then subsequently either remained stationary or became worse. This feeling of "getting better" seems to be a phenomenon peculiar to many judiciously administered vaccines, whether specific or not, and indeed seems to follow the injection of other kinds of proteids. It does not seem, therefore, that it can be considered as an indication that the particular vaccine is certainly acting specifically upon the jaws.

Assuming that a vaccine be correctly administered and no satisfactory result be obtained, either the patient or the vaccine is at fault. When the patient is at fault he is unable to respond with essential reactions. When the vaccine is at fault it is because it is imperfect. Of possible imperfections in vaccines, the following reasons may be adduced:

(1) Germs once grown on artificial media cease to be truly autogenous.

(2) Cultures, as a rule, are taken from the ends of teeth or from a sulcus about the neck of a tooth. In each the affected tissue may be in a partly necrotic condition, and, as a result, there may be added to the culture secondary infections or secondary (evolved) types which are not concerned in the primary infection. When mixed growths are obtained under such conditions, who can say whether all or a proportion only of the germs shall be used in preparing a vaccine?

(3) Not all the germs concerned in the infection may grow. This is a very important point and one often completely lost sight of by bacteriologists. It means that the vaccine administered may not

represent all those growing in the living body. Its injection may lead to improvement in the disease, or it may possibly lead to an exacerbation by influencing only a portion of the infecting agents.

As a matter of practical medicine, it is more sound when treatment by extraction, or even local measures, appears to be giving good results, to leave well alone, and not try to enhance the recuperative powers of the patient by vaccines, or worse may happen—his immunity may break down. It should be remembered that after the teeth are extracted there remains a residual infection from which the patient is getting a small continuous dose of truly autogenous vaccine or its products, or both. The rule, therefore, seems to be: Leave well alone; do not meddle. There are branches of medicine other than midwifery where meddling may do harm.

*Method Three.—Removal of diseased tissue by extraction and closure thereby of ports of re-infection. Reduction of the mass of infection.*

(a) *Complete removal of the teeth.* This, though not always advisable, is a rational and radical method of treatment. By its means large masses of infected tissues are removed and ports of re-infection at the necks of the teeth are effectually closed, and the body is left to deal with the infection remaining within the jaw bones. In addition, the whole body is flooded with a natural autogenous vaccine, which often produces a marked reaction, with subsequent improvement of the general condition.

(b) *Partial removal of the teeth.* Partial removal of the teeth is suggested by the age, sex and condition of the patient, by a comparatively little damaged alveolar edge, and when either there is little infection of the deeper tissues, or if infected they show well marked reparative changes. The immediate result of the treatment is to leave cleansable spaces between the teeth, to reduce the mass of infected material, to lessen the number of ports of microbial entry, and to set free a certain amount of autogenous vaccine.

Such cases may be further treated by local measures, and, if progress be not considered satisfactory, with vaccines—cultures for which may be obtained from the apex of a tooth, or from a scraping of the bone of a socket immediately after extraction, or better still from a portion of bone trephined from the alveolar process.

*Method four.—Treatment by electricity, radiations, etc.*

So far but little appears to have been done in this direction. Ionization has been used in dentistry for many years, but as used I have not been able to satisfy myself that the results obtained have been in advance of local drug treatment combined with thorough cleanliness on the part of the patient. It would, however, seem that electrical treatment of some kind should be able to stimulate a tissue that has grown callous in the same way that it may at times lead to

improvement in a callous ulcer. Treatment by X-Rays has been reported and the results spoken of as promising. The method must be regarded as being in its early experimental stage.

*Method Five.—Treatment of convenience.*

In aged patients, those, for example, over sixty-five, whose general condition is good and who do not appear to be suffering in any definite way from local infection, and in whom marginal destruction is not great, are, as a rule, best left alone. In younger patients, especially those under fifty, in whom there is marked absorption of the alveolar edge which is likely to progress, but in whom the general infection does not seem to be an important question, must be considered from a purely dental aspect. If the infection is allowed to continue the alveolar processes may become absorbed to such an extent that the wearing of dentures may become a difficult matter. It is well, therefore, to point out this aspect of the case to the patient or his medical adviser, and leave the decision in the hands of the dental surgeon.

So arranged under general principles the treatment of patients, as suggested by radiographic evidence, appears simple, though in actual practice it is not so. The difficulty lies chiefly in the interpretation of the radiograms in reference to the amount and state of the infection, the reactive possibilities of the patient and the relation of the disease from which he is suffering to the jaw infection. A broad view must be taken or the results will be disappointing.

SUMMARY OF SOME OF THE RESULTS OF TREATMENT.

The immediate result of treatment by extraction is: (1) To reduce the mass of infected material, (2) to wash the wounded parts with fresh serum, and (3) to flood the body with an autogenous vaccine. Later the local wounds heal, closing many ports of entry for germs, and so give the body undisturbed leisure to deal with the residual infection. The autogenous vaccine causes a reaction which may be so transient and mild as to pass unnoticed, or so severe as to make the patient decidedly ill. The reaction in the vast number of well chosen cases is followed by an increase in the immunizing powers of the patients, and is shown subjectively in the improvement of their general well-being, and of any related disease.

It should not be lost sight of that improvement in the general well-being of the patient may be due partly to the absorption of the products of the breakdown of the pathological material left in the jaws after extraction, by means of which constitutional reactions may be brought about similar to those induced by the introduction into the body of foreign proteids used in non-specific therapy.

A reaction including an exacerbation of the general symptoms complained of by the patient, which is followed by improvement, is strong evidence in favor of the relation of the conditions, so that a

subsequent relapse points either to an inability of the patient to deal with the residual infection in the tissue in relation to the teeth removed, or to infection in relation to teeth not removed, or there may be subsidiary centres of infection elsewhere in the body.

Of the causes of relapse by far the most important is, in my opinion, incomplete removal of infected material from the jaws, by which I mean leaving behind infected teeth. Attempts to remove residual infection by curettage are by many held as unsurgical, as portions only of the diseased material can be removed and damaged infected tissue is left behind. Moreover, the results of extraction alone are so favorable, providing all infected teeth are removed, that other surgical treatment seems unnecessary. Further, the evidence shows that the less damage that is inflicted upon the supporting structures, the better for the patient.

This leaving behind of infected teeth is not, as a rule, done intentionally, but in ignorance of their condition. Up to recently the essential lesions looked for by most practitioners have been the so-called granuloma or abscesses at the ends of roots, and these on discovery have been removed. The results in some cases have been good, but in others disappointing. It is thus a first essential in interpretation to discover the extent of infection, for without that information judicious operative measures cannot be designed. The second essential point, one which may considerably modify the first, is to estimate from the films the reparative powers of the patient, such powers being judged by the presence or absence of certain types of sclerosis, from the clearness or haziness of the shadows, from the condition of the laminæ duræ, from the lucency of the roots, the age of the patient, and so on.

Such, so far as I can put my thoughts on to paper, are the principles upon which I feel that treatment of these cases should be based. The subject is a difficult one, the difficulty of which can be judged by those only who have patiently tried to read in radiograms the meaning of the varying shadows.—*The Dental Record*.

(1) Chronic Deep Infection of the Jaws. By Stanley Colyer. *Lancet*, 1922. I., 175.

(2) Radiographic Changes in Chronic Infection of the Jaws. Chapter xxxvii. by Stanley Colyer in *Dental Surgery and Pathology* by Sir Frank Colyer (1923)

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## The Radio Set

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Receiving stations are your small ears;  
 Listening all day, there's so much one hears—  
 Nothing within them must ever be found  
 Blocking their tubes, or stopping the sound.  
 Remember, my dears, you cannot replace  
 This radio set that's back of your face.

Dora L. Cameron.



## A Sprig of "Sweet Mary"

WHAT a wondrous wealth of memory is wrapped up in a single leaf of Sweet Mary—that dear, old-fashioned plant that grew by the boyhood home. To-day I sit with a letter in my hand, and as I open it I catch a faint familiar odor. It is from a small pressed leaf of Sweet Mary, slipped there by a loving hand. I lean back with the letter unread and close my eyes. I see a school-house and a church—a school-house with hacked seats and whittled desks, nicked with wanton knives. I see a blackboard with scrawling marks upon it—crude love messages written with a small, cramped hand. I see an ogre sitting up in front with a birch rod and a heavy ruler by his side. I see some uneasy boys shuffling their feet in unconscious restraint at their imprisonment. I see some bright-eyed girls, dear sweet girls, whispering surreptitiously to each other, with hands up to the mouth and giggling now and then. I hear the suppressed hum of the school-room and smell the impure air. Suddenly I see the room burst out for recess, and hear the uneven shuffling of small feet toward the door. Then I hear the shouts and the scamperings of boys and girls let loose. I see a yard full of running, leaping children. Then I hear the bell of recall—the dismal toll of doom. And again I see the ogre and the rod and ruler.

Then I see a small church with stiff-backed, hard and torturing pews. The floors are bare, and at each step a loud sonorous sound breaks along the echoing walls. A hollow cough booms on the stillness. There is a solemn, sombre air, and a staid suppression of the vital forces of human kind. I see a man in black ascend the pulpit with a very white collar and a jet black tie. I hear the high-pitched, screechy voices singing the hymn, and I listen to the long prosaic prayer. Then I hear of hell-fire till I can smell the brimstone and see the darting eager flames. I go home to cower in dread and fear and agony. I cover my head with the bedclothes in abject misery—hopeless that humanity can ever escape those terrifying flames. Nothing

but the blessed balm of boyish sleep, and the bright sunshine of the following morning could ever dispel the depressing gloom. That dismal doctrine of hell doled out by the men in black has saddened the lives of countless boys and girls.

And as I sit with the unread letter in my hand I see a fireside, with a familiar loving form plying her evening care around the kitchen stove. And I smell the odor of cooking, and hear the clatter of dishes, and then the shuffling of chairs around the table. And I see the lamp hung low—the dim lamp, with faint shadows and meagre illumination. I hear the chatter of voices mingling with the sounds of knives and forks, and then I hear the shuffle of the chairs again. I see the wood-box heaped high behind the stove, and the shavings whittled on the side of a dry pine stick ready for the early morning fire. I hear the blustering, boisterous wind out-of-doors, and see the swirling snow packing against the window-pane. I crawl between the blankets on a feather bed in a cold room, and curl up with knees to nose to get warm.

And I see the spring burst forth, and bring the big lilac bush in bloom, and I hear the full-throated bull-frogs boom down in the swamp. I see the face of a dark-eyed girl, and hear her voice, and feel the thrill of my first love. I hear the stammer of my boyhood friend, and see his awkward, shuffling gait, and then he goes out of my life and I see him no more. I tread the soft summer turf with bare-foot glee, and go fishing in the pond. I feel the first nipping frost of autumn, and rebelliously begin to put on heavy wraps. I sleigh-ride down the hill on moonlight winter nights, and come in with ruddy, tingling cheeks.

I live over again the cycle of my childhood days, and watch the familiar forms and figures come and go, till one by one they recede into the dim and distant past and forever vanish from my sight.

I am still sitting, smelling the sprig of Sweet Mary, and holding the unread letter in my hand.

C. H. Johnson

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## The Parable of the Golfer

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AN anonymous writer in *World-Wide* presents a word picture, in the form of a parable, of a tired business man. The story is doubtless equally applicable to the tired professional man:

“And he went unto a physician, who took his blood pressure and listened to his heart action, and said, ‘Thou must have outdoor exercise.’”

So this man joined a golf club, which cost him an entrance fee of five hundred shekels and two hundred shekels more for annual dues. And he bought some clubs and some balls. And every time he set a ball on the tee it was another dollar bill that he sent off into the tall grass. And what exercise he did not get, his caddy got hunting for the balls.

And he bought an automobile to take him to the golf club and back. And his blood pressure went down and so did his bank account.

And one day he received a beautiful letter from the bank, telling him that his bank balance was written in red ink. And he hurried down to the bank and discovered that it was easy to make and possible to float and hard to pay a thirty days' note.

And he began to worry and his blood pressure went up again.

And he talked it over with his wife.

Now she was wise in her generation. And she inquired of him saying,

'How far is it around the golf course?'

And he said, 'I should think about five miles, not counting the nineteenth hole.'

And she inquired, 'How far is it to the golf club?'

And he said, 'About two miles and the half of a mile.'

And she said, 'Thou didst buy an automobile to take thee five miles for the privilege of walking five miles.'

And he considered the matter.

And he sold his automobile, and he sold his membership in the golf club, and he and his wife they walked up to the golf club and back, and he felt as good as if he had walked five miles around the course.

And he said, 'To-morrow we will walk in another direction.'

And they walked as far in another direction, and rested together, and had a glass of lemonade and returned.

And he said, 'This doth not exercise mine arms, but I have an hoe and a garden.' So he and his wife worked in the garden.

And his blood pressure came down and his bank account filled up.

And he said, 'There are men who ought to play golf, but I am not one of them, and I am getting the value of it in other and less expensive ways. For there is little need that I should keep an automobile to convey me five miles, for the sake of getting me to a place where I can walk five miles.'

And if his blood pressure getteth much lower and his bank account much higher, it may be that he will again take up golf."

## The Family Budget

UNFORTUNATELY, in speaking of thrift, the majority of people do so having in mind only the saving or putting aside of a certain amount of money every month or every year. The first consideration in thrift and in the family budget is the expenditure of income in a way that will be most productive of physical fitness through wholesome living. This means wise planning and wise spending, which is essential to a well-balanced family life. It means so planning our family budget as to secure the well-being of ourselves and family not only for the present but also for the future, thereby making for domestic happiness. This planning must be based on a proper standard of living and that standard must embrace all that is essential to the maintaining of mental and physical fitness, and, in families where there are children, must embrace that which is even more essential, ample building material, in order to ensure proper physical development.

Viewing it in a monetary sense, it must be apparent that unless we keep our people physically fit, which can only be secured by proper nutrition, we cannot hope to get in return 100 per cent. efficiency, and unless our children are properly fed, with a properly balanced diet, they will be subnormal physically and intellectually and destined early in life to become a liability rather than an asset to the city and to the nation.

The primary essential, of course, is a proper revenue for the home, and then a carefully thought-out system of expenditure of that revenue. Someone has said that the budgeting of our expenditures is "the procedure by which we worry before we spend the money, rather than after." The family is but an integral part of the government. Let the principle of budgeting expenditure begin with the family.

In this planning of the expenditure of the revenue of the home or for poor relief, it is well to bear in mind that "Whatsoever a man soweth, that shall he also reap," and "He which soweth sparingly shall reap also sparingly." If the nutrition is subnormal, supplying only 2,000 or 2,500 calories instead of 3,500, you will get 80 to 90 per cent. of efficiency instead of 100 per cent., and what is still more disastrous is that the children receiving this low standard of nutrition will develop subnormally.

### THE FAMILY BUDGET.

In considering the planning of the family budget, we are likely to have in mind two standards—first, the minimum of subsistence, which is oftentimes referred to as a living wage, and second—the minimum of subsistence with comfort. The essential elements of a normal standard of living are food, clothing, rent, fuel, and sundries. These must all be considered in the order of their importance in the family budget. In carefully considering the cost of every item for a family

of average size, that is, father, mother, and three dependent children, the actual minimum amount for the maintenance of the family in a physically fit condition must necessarily vary more or less with the cost of living. Recent studies, however, in the cost of living carried out by Municipal Research Boards, Bureaus of Labor Statistics and Wage Arbitration Boards, place the minimum figure representing the cost of living for a family of five at from \$1,200 to \$1,400.

Fortunately, all of the budgets that have been prepared or suggested place food as the most important item and set aside 50 per cent. of the entire expenditure of the home for this purpose. It must be borne in mind that our shelter may be poor, simply enough to efficiently protect us against the elements; clothing may be inadequate, but the life of the individual depends on his nourishment, and therefore food must receive first consideration as regards quality and quantity, embracing all the elements that constitute a balanced diet.

With clothing requirements, it is very difficult to establish any standard, as the requirements vary widely according to climate, age and occupation of the various members of the family. Furthermore, the general experience is that the cost of clothing increases with the increase of income. Prosperity is oftentimes reflected in the clothing which should always be, as Shakespeare expresses it, "Only as costly as thy purse will bear."

Rent requirements vary greatly according to the location and they are also governed by supply and demand. However, it is essential to have decent, healthful living quarters, which should be procurable at a reasonable cost, and surrounded by all necessary sanitary safeguards. The minimum requirement is that not more than two people should occupy the one room. There should be sufficient yard in connection with the home to afford a small playground for the children and an opportunity for drying the laundry.

The fuel and light requirements vary, of course, with the size of the dwelling or the apartment, as the case may be, also the location, fuel usually being more plentiful and lower in price in the country than in the city.

Sundries: What is generally included in sundries are health needs, doctor, medicine and nursing; church dues, recreation, transportation, newspapers, house furnishings, such as utensils, dishes, cleaning material, etc.

In the compilation of all budgets, the consensus of opinion has been that the following proportions should be set aside just in the order of their importance:—

Food .....	50 per cent.
Clothing .....	10 to 20 per cent.
Rent .....	10 to 20 per cent.
Sundries .....	5 to 20 per cent.

## FOOD IN THE FAMILY BUDGET.

Inasmuch as all of the family budgets that have been prepared provide that 50 per cent. be expended in food, a knowledge of food and food values is most necessary as well as a proper understanding of what constitutes a balanced diet, together with an adequate knowledge of proper methods of cooking. The condition of a large percentage of undernourished children is not the result of insufficient food but rather of improper food. Careful investigation made by the New York Association for improving the condition of the poor revealed the fact that many of the children at the various camps for malnutrition had been getting sufficient food at home, but it had been lacking in one or more of the essentials of a balanced diet. When this was corrected in the home, the children promptly gained in weight.

One great difficulty in our educational campaign on food, food values and nutrition, is in eliminating all technical terms, inasmuch as a proper knowledge of food and food values is necessarily based on a knowledge of chemistry, physiology and biological chemistry. However, Professor Sherman of Columbia University offers the following valuable suggestion which if carefully followed out will ensure a fairly well-balanced diet: "Spend at least as much for milk as for meat, and as much for vegetables and fruit as for meat." We can only hope our readers will mark and inwardly digest this—read and re-read until these words are indelibly impressed on their minds. They meet with our fullest endorsement, as milk contains all three vitamins and we all eat too much meat.

It is important to keep a record of food purchased week by week, for reference and also so that the nurse or social welfare visitor may go over these items with the mothers and where necessary make suggestions.

A knowledge of food values and what constitutes a balanced diet should occupy a prominent place in the education of every child, not only in the primary schools but in our collegiate institutes and colleges, that the facts may be permanently impressed on the minds of our boys and girls, and in addition to this, every girl should be taught how to select and cook the various foods.—*Health Bulletin*.

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Dr. Bryce Talks About Consultations

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**I**N the September issue of the *American Journal of Clinical Medicine*, Dr. C. A. Bryce says: "In the course of our professional work, we meet conditions demanding consultations with our colleagues over obscure or difficult cases, and, as these meetings involve so many delicate possibilities and have been causative of

some serious differences between formerly good friends, I will mention a few cautions that might be observed in regard to all consultations between physicians, regardless of friendship or other considerations.

In the interests of the younger members of our profession, I am going to say at the start that there is no way by which a medical man can so surely break himself up with a family than by asking for or accepting a consultation with the wrong kind of a doctor!

When you call a doctor to consult with you, you let him enter your fortress and show him your hand. He knows your diagnosis, your line of treatment and its unsatisfactory results—all before he has committed himself in any manner. If he is an honest, ethical gentleman, he will tell *you* privately just what he thinks and will suggest any measures that he may believe advisable; and he will tell the patient or his family, *in your presence*, that he fully approves of your conduct of the case. It makes no difference how much you have blundered, he is there to protect you and to help you to cure your patient. If he is a crook, he will pretend to you to endorse your course, but he will by some underhand methods let the patient or family understand that “it was lucky that *he* was called in time.”

It has been my misfortune to have had several unpleasant consultations in the course of a long practice, and I am serious in my advice on this subject to those who may yet have some things to learn. There is a vast difference between a consultation asked for by the attending physician for his own satisfaction in treating a doubtful case, and one thrown upon him by patient, family or (more often) through outside influences.

One thing a physician should always bear in mind when a consultation is asked for by patient or family: It is, that there exists a doubt as to the correctness of his diagnosis and treatment, a lessening of faith in his ability to safely conduct that case further. Just here is where I have always somewhat resented the suggestion when coming from the family, although we should make allowances for natural anxiety and decide the question from our own viewpoint. If we accept a consultation, which we certainly should in very grave cases, it remains for us to be satisfied with the physician with whom we are asked to consult. As a rule, where the family has the proper regard for your feelings, they will always leave the selection of the consultant to you, and in this case you have no cause for objecting. It will be in good taste to name some physician of your choice and ask if he will be entirely satisfactory to them.

But, it is entirely different when a consultation is requested by the family and they name the physician whom they desire you to meet. This is little short of a request for you to retire from the case,

and it is a situation that I have always promptly met by immediately withdrawing. \* \* \* \*

Long since, I made it a rule for myself to consult with no man I did not like, nor with any man selected by the family as my consultant, unless he was a personal friend. I always retire from a case when the family request me to call a particular doctor in consultation. I never enter into consultation concerning the patient, in the presence of anyone, except the doctor or doctors who have seen the case. I never ask any consultant, however friendly he may be, to call in and see the patient, any time, in passing. I make it a rule never to become the family physician of any family with whom I may become acquainted through a consultation. I consider consultations in many instances hazardous alike for patient and attending physician!!”

C. A. BRYCE.

516 N. Tenth St., Richmond, Va.

### Class of '19, R.C.D.S.

THE class of '19 Royal College of Dental Surgeons is to be complimented upon its organized effort to further the best interests of the class. The Committee has arranged the following programme:

October 3rd—"Drugs Used in Dentistry." S. M. Richardson.

Host: H. G. Bean.

October 31st—"Exodontia." H. A. Hartford.

Host: S. M. Richardson.

November 28th—"Business Management." A. M. Hord. "Taking the Bite for Full Dentures." B. M. Ott.

Host: A. M. Hord.

January 16th—"Periclasia." S. S. Crouch.

Host: R. M. Watson.

February 13th—"Diet." L. D. Drew-Brook. "Anaesthesia." R. M. Watson.

Host: J. J. Lavine.

March 12th—"Operative Procedures." W. L. Hugill.

Host: L. D. Drew-Brook.

April 9th—Clinic "Preventive Orthodontia." H. G. Bean.

Host: H. G. Bean.

April 30th—"Crown and Bridge." J. J. Lavine.

Host: B. M. Ott.

Officers of the class are as follows:

President, H. G. Bean; Vice-President, L. D. Drew-Brook; Secretary, B. M. Ott; Treasurer, R. M. Watson; Censor, A. M. Hord.

# THE COMPENDIUM

This Department is Edited by  
THOMAS COWLING, B.A., D.D.S., Toronto

A SYNOPSIS OF CURRENT LITERATURE RELATING  
TO THE SCIENCE AND PRACTICE OF DENTISTRY

## HISTORY OF A CASE OF CARCINOMA OF THE ANTRUM.

THE effectiveness of radium treatment for cases of carcinoma is amply proven by a case cited by Dr. George W. Brown of the Radium and Oncologic Institute of Los Angeles, a report of which is published in the Dental Record (March, 1923).

The patient had received a blow in the nose with a hammer, in 1919, from which time he dates his trouble. In June, 1921, he had neuralgia on the side of his face and had two teeth extracted, but without relief. Later he had a radiogram taken, though no pathologic condition was found. Then he experienced a burning sensation in the lip, nose and cheek and a thin watery discharge came from the nose. On November 29, 1921, Dr. Brown examined the case and found the right side of the nose occluded, caused by a deviation of the nasal septum, and his right eye was almost swollen shut and he was suffering great pain in the region of the maxillary sinus. On December 20, a sub-mucous resection of the nasal septum was made. The right eye, although much better, was still swollen.

On December 27 a radical antrum operation was performed and there was removed an amount of what appeared to be cancerous tissue. The infra-orbital nerve was resected, which relieved the pain considerably. The laboratory findings of the specimen was carcinoma of the antrum. The patient was then referred for radium treatment. On February 2, an opening was made leading directly into the antrum. Radium treatments were taken from February 3 to April 13, 1922. By May 26, 1922, all evidence of the disease had disappeared and the patient is to-day greatly improved in health.

The radium treatment was as follows: An opening was made into the antrum through the roof of the mouth about 2 cm. in diameter, opposite the second molar. The antrum was found to be filled with carcinomatous tissue. Through this opening radium was introduced into the cavity and 2,153 millicurie hours were given equally disposed throughout the cavity of the antrum between February 3 and April 13, 1922. On May 26, 1922, all evidence of the disease had disappeared, leaving the antral cavity communicating with the nasal cavity and with the mouth through the surgical opening. Patient was recommended to visit a dentist for a prosthetic appliance.

# ORAL HEALTH

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No. 10

## EDITORIAL

### The American Dental Association's Annual Convention

THE sixty-fifth annual meeting of the American Dental Association, recently held in the City of Cleveland, will pass into history as one of the most noted dental gatherings yet witnessed on this continent. Something over eight thousand dentists, from the four corners of the United States and Canada, registered as members or guests of this huge organization. That such a gathering could be comfortably housed, and their many other needs and inquiries so courteously attended to, speaks volumes for the efficient manner in which the officers and local committees did their work.

The many dentists from Canada who attended the meeting did so as guests of the American Dental Association, and as such were most generously and courteously treated. Cleveland lays claim, and rightly so, to be classed amongst the convention cities of the continent. A large auditorium, capable of seating some 8,000 people, was made the centre of all the dental activities of the convention. Here we found the registration booths, where old friends again greeted each other and where many new friendships were formed. Here were also found the educational exhibits from the different states, including Canada. On the basement floor, some 200 exhibitors found an ideal room for displaying the latest in dental equipment and instruments.

The headquarters of the different sections were held in the larger

hotels of the downtown area of the city. The last two half days were given over entirely to clinics, which were splendidly arranged on the main floor and the galleries of the auditorium.

The inspirational and unifying, as well as the educational, effects of such a gathering to the dental profession were beyond calculation. Almost every department of dental practice found a place on the programme. Most of the states of the Union, as well as Canada, sent their quota of men and women to take part.

Two subjects (comparatively new) found a prominent place in the discussion of the week, viz., Diet and Traumatic Occlusion, which indicates that the dentist to-day as never before is endeavoring to combat dental diseases by first searching out the cause.

But, after saying this, and much more might properly be said, the question still arises: Is the present convention plan necessary or wise in the carrying on of the work of such a central body as the American Dental Association? If this splendid organization is ever likely to find the yearly burden growing heavy, it is because of the tremendous organization necessary to carry out successfully these yearly conventions. True, a vast number of dentists are brought together and much enthusiasm shown; but, after all, the best programme of papers and clinics possible are but those given by men and women drawn from the different state societies. Would it not, therefore, work out advantageously to the greatest number if, instead of a yearly national convention, more emphasis were placed on the different state conventions, where a much larger percentage of dentists would be able to attend?

In order to obviate any possible narrowness of dental views, an inter-state plan of reciprocity might easily be carried out, so that the desirable talent of the nation would be passed from state to state. The American Dental Association would then be free to devote its whole time and energy to the important work of standardizing and stimulating the dental activities of the whole nation.

The same principle might, with profit, be applied to organized dentistry in Canada.

The Canadian Dental Association as a central and unifying organization might be well advised to drop the convention part of its programme and constitute itself a purely administrative and advisory body. Such an organization, composed of properly appointed dentists from the different provinces, would find an important field of work in aiding to standardize the different dental activities of the provinces.

In a word, we say national organizations in dentistry are a real necessity and their influence cannot be well estimated, but whether the convention part of the organization will prove as necessary and as profitable in the future as in the past is perhaps open to serious discussion.

R. G. McL.

# ORAL HEALTH

A JOURNAL THAT STANDS FOR THE "OUNCE OF  
PREVENTION," AS WELL AS THE "POUND OF CURE"

Vol. 13

TORONTO, NOVEMBER, 1923

No. 11

## The Dentition of the Western and Central Eskimos\*

BY STEPHEN G. RITCHIE, B.A., D.M.D., L.D.S.  
*Dalhousie University.*

**I**N the collection of skulls and mandibles under examination all the dentures were complete or nearly complete at death. Owing to the primitive methods of burial, with a few notable exceptions, the specimens are now partially or wholly edentulous.

All the teeth present, regardless of condition, have been, where possible, carefully measured in millimetres after the method advocated and used by the late Dr. G. V. Black, of Chicago, and the measurements checked and tabulated in tables I and II. Average and greatest measurements will be found side by side for comparative purposes with similar measurements made and compiled by Dr. Black from a very large number of miscellaneous teeth collected by him.

A critical study of the teeth and jaws of the Eskimo is instructive and interesting. The dental arches are large and beautifully formed, approaching closely to the normal ideal Caucasian type as presented by Selenka and Rose<sup>(2)</sup>. The curve of the arch is in all cases semi-elliptical, and numerous measurements and calculations made indicate that it is almost mathematically accurate. In measuring the maxillæ, a point that has hitherto, as far as I am aware, escaped notice was observed, namely—that the anterior palatine foramen is located exactly at the focus of the ellipse. The arches are broad and short, the greatest breadth or minor axis of the ellipse being in the neighbourhood of the first and second molars, the third molars and tuberosities of the jaws lying on the inward falling, backward curve with a

\*Report of the Canadian Arctic Expedition on the Copper Eskimos.

proportional decrease in breadth in this region. To one accustomed to the malocclusions of the civilized races the symmetry of the dental arcade in these Eskimo jaws is striking. Only the slightest trace of irregularity is in evidence in two cases—in one the canines, in the other a pre-molar being slightly out of alignment.

The occlusion in this race seems to be universally prosharmonic, i.e., the teeth meet edge to edge. When this condition maintains, the cusps of the premolar and molar teeth are usually short and the occlusal plane is flat or faintly curved in the antero-posterior direction. Such an arrangement permits of greatly extended forward and lateral excursions of the lower jaw as contrasted with the restricted movements of Caucasian dentitions where a more or less pronounced overbite of the upper teeth with a markedly curved occlusal plane, and length of tooth cusp developed accordingly, is the rule with few exceptions. But an edge to edge bite has far-reaching consequences; no matter in what race it is found the wear of the teeth is pronounced. In the Eskimo it reaches the extreme. Here, at middle age, the crowns of the incisors in many cases are completely worn away; the cusps of the second and third molars have disappeared; and, in the first molar and premolar region in the maxilla the entire lingual and occlusal portions of the teeth from the buccal marginal ridge to the cervical border of the lingual surface have been ground away, leaving oblique planes which meet and occlude with the counterparts in the mandible where the buccal aspect of the teeth has been removed almost to the same extent, leaving the sharp occlusal margins of the lingual enamel plates intact and highly polished flat surfaces bevelled almost to the buccal gum margin.

Coincident with this extreme wear of the teeth the dental pulps have taken on their original function with conspicuous success. Sufficient new dentine of fine quality has been formed to obliterate the pulp chambers and in some cases even the root canals of the teeth. This new growth of tissue is found in every case where access to the pulp chambers has been threatened. There has therefore been no destruction of the pulps through infection, and consequently alveolar abscesses are apparently unknown. Perhaps this is just as good a place as any to mention the fact that in all the teeth examined there is not the slightest trace of caries. Salivary calculus too, even in the oldest skulls, with one exception which will be referred to later, is entirely absent, as is also any trace of pyorrhoea, or resorption of the alveolar margins. These latter, however, are thicker than those of civilized races and the blood supply is abundant.

An edge to edge occlusion has a further result which is conspicuous in a very large percentage of the skulls examined. This is the shallow broad glenoid fossa and the flattened eminentia articu-latis which are typical of the Eskimo race. A reference to the plate

will show how pronounced these characteristics are. It has been shown by eminent dental authorities<sup>(3)</sup> that the movements of the mandible during mastication are governed by the guiding action of the canine teeth and the inclined planes on the cusps of the premolars and molars. The varied actions of the condyles *are the result* of these movements and *not* their cause. As a corollary to this it may be said that the depth, form and extent of the glenoid fossa will vary according to the antero-posterior curvature of the occlusal plane and the extent of overbite exhibited by the anterior teeth, with consequent restriction or non-restriction of the movement as the case may be. In connection with this important point it might be well to point out that the anatomy text-books are undoubtedly wrong when they state that the mandible is a lever of the third class<sup>(3)</sup>.

By reference to tables I and II, it will be seen that the average measurements of the Eskimo teeth tend to be greater than those of the more civilized races. This is particularly true in the molar series which, unlike the civilized dentition, tends to revert to the generalized mammalian type, where the molars increase in size in the antero-posterior direction. The teeth as a whole are more symmetrical and stick closer to the ideal typical forms than do those of the white races. There is in these jaws no sign of extremes in root development; nor, with the exception of the third molar, where variation is world-wide, is there any indication of the fusion of molar roots spoken of by Wingate Todd<sup>(4)</sup> as common in the Eskimo. Prominence of the lingual molar roots, spoken of by Knowles<sup>(5)</sup> is nowhere greater than might be expected. In my opinion, in individual Eskimo teeth there is far less variation from the mean than in any of the civilized races, and in this race we have the finest typical forms of teeth and the best dentitions in the world. Owing to their food habits<sup>(6, 7)</sup> I am strongly inclined to think that during the lapse of time not only the jaws, but the teeth, have been growing progressively larger.

One or two other facts are worthy of notice. An examination of the maxillary sinuses shows that in no case is there a projection of the roots of the molars or premolars into them. It was further noted that these sinuses are extremely large, with walls so thin as to be translucent. Apart from their function as resonating chambers, with the ample blood supply and fatty tissue of the cheeks covering them, it occurred to me that they might act as reservoirs for warm air which would aid materially the mucous membranes of the nose in the process of respiration when temperatures are low.

In the mandibles of adult individuals a pronounced reinforcement of the alveolar process on the lingual sides of the premolar teeth which gradually vanishes as the molar series is reached is to be noted. This extraordinary growth of bone tissue (in specimen F. 31 it attains a thickness of 11 mm. below the 2nd premolar), is peculiar to the

TABLE I.—MEASUREMENTS OF THE TEETH—MAXILLA

	H-4	H-5	H-6	D-1	D-2	D-4	D-S	F-1	F-2	F-4	F-8	F-16	F-17	F-22	F-24	F-26	F-33	Av.	Gr.	Civilized
																		Av.	Gr.	
CENTRAL INCISOR																				
A.....	3.0	—	—	—	—	—	—	4.1	—	—	—	—	18.7	—	—	—	5.4	18.7	22.5	27.0
B.....	—	—	—	—	—	—	—	—	—	—	—	—	5.6	—	—	—	—	4.5	10.0	12.0
C.....	—	—	—	—	—	—	—	—	—	—	—	—	13.1	—	—	—	7.0	13.1	12.0	16.0
D.....	6.8	—	—	—	—	—	—	8.2	—	—	—	—	7.1	—	6.2	—	6.1	7.4	9.0	10.0
E.....	7.5	—	—	—	—	—	—	7.5	—	—	—	—	7.1	—	—	—	7.3	7.4	6.3	7.0
F.....	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7.0	8.0
LATERAL INCISORS																				
A.....	2.0	—	—	—	—	—	—	—	16.0	16.0	—	—	—	—	—	—	—	16.0	22.0	26.0
B.....	—	—	—	—	—	—	—	—	2.0	2.0	—	—	6.6	—	—	—	6.2	4.2	6.6	8.8
C.....	—	—	—	—	—	—	—	—	14.0	14.0	—	—	—	—	—	—	—	14.0	13.0	16.0
D.....	6.0	—	—	—	—	—	—	—	6.0	6.0	—	—	6.5	—	5.2	—	6.5	6.3	6.5	7.0
E.....	7.1	—	—	—	—	—	—	—	5.2	5.2	—	—	5.0	—	—	—	6.1	5.0	4.4	5.0
F.....	—	—	—	—	—	—	—	—	6.1	6.1	—	—	6.7	—	—	—	6.8	6.7	7.1	7.0
CANINE																				
A.....	7.1	—	—	—	—	—	—	25.1	—	20.7	—	—	22.6	—	—	—	22.7	25.1	26.5	32.0
B.....	—	—	—	—	—	—	9.0	7.9	—	3.5	—	10.0	6.5	—	2.7	—	7.5	7.5	9.5	12.0
C.....	7.5	—	—	—	—	—	—	17.2	—	17.2	—	—	16.1	—	—	—	15.2	16.4	17.2	20.5
D.....	6.3	—	—	—	—	—	8.5	8.4	—	6.1	—	8.0	7.7	—	7.1	—	7.3	7.7	8.5	9.0
E.....	9.1	—	—	—	—	—	6.3	6.6	—	5.2	—	6.0	6.1	—	6.5	—	5.7	6.1	6.6	6.0
F.....	—	—	—	—	—	—	8.0	8.8	—	7.5	—	8.5	8.0	—	8.2	—	8.0	8.3	9.1	9.0
1ST PREMOLAR																				
A.....	20.8	—	—	—	—	17.5	—	22.1	—	17.3	—	—	6.2	20.2	17.5	—	—	19.2	20.6	22.5
B.....	6.2	—	—	—	—	8.0	—	7.2	—	5.0	—	—	—	7.3	2.4	—	—	6.0	8.2	9.0
C.....	14.6	—	—	—	—	9.5	—	14.9	—	12.3	—	—	7.0	12.9	15.1	—	—	13.2	12.4	14.0
D.....	7.5	—	—	—	—	8.0	—	7.4	—	6.6	—	—	5.6	6.6	5.6	—	—	7.0	8.0	8.0
E.....	5.2	—	—	—	—	5.3	—	5.6	—	5.1	—	—	5.2	5.2	5.3	—	—	5.3	4.9	6.0
F.....	10.0	—	—	—	—	9.0	—	10.0	—	9.0	—	—	9.3	9.0	8.1	—	—	9.2	9.1	10.0
2ND PREMOLAR																				
A.....	19.2	—	—	—	—	18.5	—	18.6	—	16.5	—	—	6.0	—	19.5	—	17.7	18.3	19.5	27.0
B.....	5.1	—	—	—	—	7.2	7.0	6.6	5.1	5.0	—	—	6.0	6.8	1.2	—	5.6	5.6	7.2	9.0
C.....	14.1	—	—	—	—	11.3	—	12.0	—	11.5	—	—	—	18.3	13.2	—	11.7	13.2	14.0	19.0
D.....	6.3	—	—	—	—	7.2	7.0	6.3	6.5	6.7	—	—	6.2	6.3	5.2	—	6.1	6.4	7.2	6.8
E.....	5.0	—	—	—	—	5.4	5.4	5.1	5.1	5.2	—	—	4.4	5.0	5.0	—	4.5	5.0	5.4	6.5
F.....	9.1	—	—	—	—	9.5	9.1	9.2	9.0	9.1	—	—	8.3	8.2	9.1	—	9.1	9.0	9.5	10.0

1ST MOLAR													
A	5.1	7.2	8.0	-	4.4	10.0	13.4	18.3	5.5	6.0	-	7.5	6.3
B	-	-	-	-	-	-	6.4	6.0	5.5	7.0	19.2	17.0	19.2
C	10.0	10.2	11.5	-	9.1	10.7	7.0	12.3	10.6	10.0	7.0	6.1	10.0
D	8.0	8.1	9.5	-	7.2	9.2	11.4	12.0	10.6	10.0	12.2	10.5	12.3
E	12.0	11.5	12.5	-	11.4	13.2	11.7	12.7	12.1	12.0	11.4	8.3	12.0
F	-	-	-	-	-	-	-	-	-	-	-	11.9	13.2
2ND MOLAR													
A	5.1	7.3	8.2	14.5	-	-	-	19.1	7.2	7.0	17.2	17.5	19.2
B	-	-	-	4.0	-	7.0	-	6.2	-	-	7.6	6.6	8.2
C	9.3	10.2	10.5	10.5	-	-	-	12.9	11.0	10.1	9.6	11.8	14.1
D	8.2	8.0	8.5	8.0	-	11.0	-	10.8	11.0	10.1	9.2	10.3	11.0
E	12.2	11.5	12.0	11.5	-	12.7	-	9.0	9.0	8.1	8.1	8.3	9.1
F	-	-	-	-	-	-	-	12.0	12.2	11.1	13.3	11.9	13.3
3RD MOLAR													
A	17.3	7.3	-	-	-	-	-	-	5.2	5.0	-	17.3	17.1
B	4.2	-	-	-	-	-	-	-	-	-	-	6.0	8.2
C	13.1	9.0	-	-	-	-	-	-	11.0	8.0	-	13.1	13.1
D	7.7	8.0	-	-	-	-	-	-	8.5	7.0	-	9.6	11.1
E	11.1	11.2	-	-	-	-	-	-	11.6	10.1	-	8.0	9.1
F	-	-	-	-	-	-	-	-	-	-	-	11.2	12.1
24.0 20.8 19.2 17.0 17.5 20.0 24.0 24.0													
9.0 7.7 8.2 10.5 8.0 7.2 8.0 8.0													
16.0 13.2 13.0 14.1 13.0 13.0 17.0 17.0													
12.0 10.7 10.0 10.3 9.2 9.2 10.0 10.0													
8.0 7.5 7.5 8.3 8.1 8.1 8.0 8.0													
12.0 11.8 13.2 11.9 11.5 11.5 12.5 12.5													
22.0 17.1 17.3 17.3 20.0 20.0 22.0 22.0													
8.0 6.3 8.2 8.0 8.0 8.0 8.0 8.0													
15.0 11.4 11.1 11.0 11.0 11.0 15.0 15.0													
11.0 8.6 9.1 8.6 8.0 8.0 11.0 11.0													
8.0 6.1 6.1 6.1 8.0 8.0 8.0 8.0													
14.5 10.6 12.1 11.2 11.2 11.0 14.5 14.5													

# EXPLANATION OF TABLES

H-4, H-5, H-6, etc., denote the number of the specimen.  
A equals length overall.  
B equals length of crown.  
C equals length of root.  
D equals mesio-distal diameter of crown.  
E equals mesio-distal diameter of neck.  
F equals labio or bucco-lingual diameter.  
Measurements in millimeters.  
Dashes show that the teeth were absent or that the measurement could not be taken without injuring the specimen.  
The degree of wear is shown by the length of crown remaining.

TABLE II.—MEASUREMENTS OF THE TEETH—MANDIBLE

	H-7	H-8	H-9	D-5	F-1	F-11	F-12	F-17	F-19	F-20	F-21	F-31	F-32	Civilized	
														Av.	Gr.
<b>CENTRAL INCISOR—</b>															
A.....	15.2	—	—	—	16.0	—	—	—	—	—	—	—	—	15.6	16.0
B.....	3.6	—	—	—	3.2	—	—	—	—	—	—	—	—	3.4	3.6
C.....	11.6	—	—	—	12.8	—	—	—	—	—	—	—	—	11.8	12.0
D.....	4.2	—	—	—	4.1	—	—	—	—	—	—	—	—	4.1	4.2
E.....	3.2	3.1	—	—	3.7	—	—	—	—	—	—	—	—	3.3	3.5
F.....	5.6	—	—	—	6.5	—	—	—	—	—	—	—	—	6.0	6.5
<b>LATERAL INCISOR—</b>															
A.....	19.2	—	—	—	16.0	—	—	—	—	—	—	—	—	17.6	19.2
B.....	4.7	—	—	—	4.2	—	—	—	—	4.5	—	—	—	4.5	4.7
C.....	14.5	—	—	—	12.8	—	—	—	—	—	—	—	—	13.6	14.5
D.....	5.2	—	—	—	4.1	—	—	—	—	4.6	—	—	—	4.6	5.2
E.....	3.6	4.1	—	—	5.0	—	—	—	—	4.2	—	—	—	4.2	5.0
F.....	6.6	—	—	—	6.5	—	—	—	—	6.4	—	—	—	6.5	6.6
<b>CANINE—</b>															
A.....	25.2	—	—	—	20.0	—	—	20.0	—	—	—	—	—	21.7	25.2
B.....	8.1	5.0	—	—	3.1	—	—	4.3	—	—	—	—	—	5.1	8.1
C.....	17.1	8.7	—	—	16.9	—	—	15.7	—	—	—	—	—	16.6	17.1
D.....	7.1	6.1	—	—	6.1	—	—	6.2	—	—	—	—	—	7.0	8.7
E.....	5.3	6.1	—	—	5.9	—	—	6.0	—	—	—	—	—	5.8	6.1
F.....	8.1	6.5	—	—	7.2	—	—	8.0	—	—	—	—	—	7.4	8.1
<b>1ST PREMOLAR—</b>															
A.....	20.7	—	—	—	15.0	—	—	—	—	—	—	—	—	17.8	20.7
B.....	5.5	5.0	—	—	3.2	—	—	—	—	—	—	—	—	4.6	5.5
C.....	15.2	—	—	—	11.8	—	—	—	—	—	—	—	—	13.5	15.2
D.....	6.7	8.3	—	—	5.7	—	—	—	—	—	—	—	—	6.9	8.3
E.....	5.0	6.5	—	—	5.4	—	—	—	—	—	—	—	—	5.6	6.5
F.....	7.6	7.0	—	—	7.4	—	—	—	—	—	—	—	—	7.3	7.6
<b>2ND PREMOLAR—</b>															
A.....	20.7	—	—	—	18.0	—	—	—	—	17.0	—	—	19.1	18.6	20.5
B.....	5.6	4.4	—	—	5.0	—	—	4.2	—	4.3	—	—	6.5	5.2	6.5
C.....	14.9	—	—	—	12.0	—	—	—	—	12.7	—	—	12.6	13.0	14.9
D.....	6.4	8.3	—	—	6.3	—	—	—	—	6.4	—	—	7.5	6.6	8.3
E.....	5.0	5.0	—	—	5.0	—	—	5.1	—	5.0	—	—	6.1	5.3	6.1
F.....	8.0	6.0	—	—	8.7	—	—	8.0	—	8.2	—	—	9.1	8.1	9.1
<b>3RD PREMOLAR—</b>															
A.....	20.7	—	—	—	15.0	—	—	—	—	—	—	—	—	17.8	20.7
B.....	5.5	5.0	—	—	3.2	—	—	—	—	—	—	—	—	4.6	5.5
C.....	15.2	—	—	—	11.8	—	—	—	—	—	—	—	—	13.5	15.2
D.....	6.7	8.3	—	—	5.7	—	—	—	—	—	—	—	—	6.9	8.3
E.....	5.0	6.5	—	—	5.4	—	—	—	—	—	—	—	—	5.6	6.5
F.....	7.6	7.0	—	—	7.4	—	—	—	—	—	—	—	—	7.3	7.6
<b>4TH PREMOLAR—</b>															
A.....	20.7	—	—	—	18.0	—	—	—	—	17.0	—	—	19.1	18.6	20.5
B.....	5.6	4.4	—	—	5.0	—	—	4.2	—	4.3	—	—	6.5	5.2	6.5
C.....	14.9	—	—	—	12.0	—	—	—	—	12.7	—	—	12.6	13.0	14.9
D.....	6.4	8.3	—	—	6.3	—	—	—	—	6.4	—	—	7.5	6.6	8.3
E.....	5.0	5.0	—	—	5.0	—	—	5.1	—	5.0	—	—	6.1	5.3	6.1
F.....	8.0	6.0	—	—	8.7	—	—	8.0	—	8.2	—	—	9.1	8.1	9.1
<b>5TH PREMOLAR—</b>															
A.....	20.7	—	—	—	15.0	—	—	—	—	—	—	—	—	17.8	20.7
B.....	5.5	5.0	—	—	3.2	—	—	—	—	—	—	—	—	4.6	5.5
C.....	15.2	—	—	—	11.8	—	—	—	—	—	—	—	—	13.5	15.2
D.....	6.7	8.3	—	—	5.7	—	—	—	—	—	—	—	—	6.9	8.3
E.....	5.0	6.5	—	—	5.4	—	—	—	—	—	—	—	—	5.6	6.5
F.....	7.6	7.0	—	—	7.4	—	—	—	—	—	—	—	—	7.3	7.6
<b>6TH PREMOLAR—</b>															
A.....	20.7	—	—	—	18.0	—	—	—	—	17.0	—	—	19.1	18.6	20.5
B.....	5.6	4.4	—	—	5.0	—	—	4.2	—	4.3	—	—	6.5	5.2	6.5
C.....	14.9	—	—	—	12.0	—	—	—	—	12.7	—	—	12.6	13.0	14.9
D.....	6.4	8.3	—	—	6.3	—	—	—	—	6.4	—	—	7.5	6.6	8.3
E.....	5.0	5.0	—	—	5.0	—	—	5.1	—	5.0	—	—	6.1	5.3	6.1
F.....	8.0	6.0	—	—	8.7	—	—	8.0	—	8.2	—	—	9.1	8.1	9.1
<b>7TH PREMOLAR—</b>															
A.....	20.7	—	—	—	15.0	—	—	—	—	—	—	—	—	17.8	20.7
B.....	5.5	5.0	—	—	3.2	—	—	—	—	—	—	—	—	4.6	5.5
C.....	15.2	—	—	—	11.8	—	—	—	—	—	—	—	—	13.5	15.2
D.....	6.7	8.3	—	—	5.7	—	—	—	—	—	—	—	—	6.9	8.3
E.....	5.0	6.5	—	—	5.4	—	—	—	—	—	—	—	—	5.6	6.5
F.....	7.6	7.0	—	—	7.4	—	—	—	—	—	—	—	—	7.3	7.6
<b>8TH PREMOLAR—</b>															
A.....	20.7	—	—	—	18.0	—	—	—	—	17.0	—	—	19.1	18.6	20.5
B.....	5.6	4.4	—	—	5.0	—	—	4.2	—	4.3	—	—	6.5	5.2	6.5
C.....	14.9	—	—	—	12.0	—	—	—	—	12.7	—	—	12.6	13.0	14.9
D.....	6.4	8.3	—	—	6.3	—	—	—	—	6.4	—	—	7.5	6.6	8.3
E.....	5.0	5.0	—	—	5.0	—	—	5.1	—	5.0	—	—	6.1	5.3	6.1
F.....	8.0	6.0	—	—	8.7	—	—	8.0	—	8.2	—	—	9.1	8.1	9.1
<b>9TH PREMOLAR—</b>															
A.....	20.7	—	—	—	15.0	—	—	—	—	—	—	—	—	17.8	20.7
B.....	5.5	5.0	—	—	3.2	—	—	—	—	—	—	—	—	4.6	5.5
C.....	15.2	—	—	—	11.8	—	—	—	—	—	—	—	—	13.5	15.2
D.....	6.7	8.3	—	—	5.7	—	—	—	—	—	—	—	—	6.9	8.3
E.....	5.0	6.5	—	—	5.4	—	—	—	—	—	—	—	—	5.6	6.5
F.....	7.6	7.0	—	—	7.4	—	—	—	—	—	—	—	—	7.3	7.6
<b>10TH PREMOLAR—</b>															
A.....	20.7	—	—	—	18.0	—	—	—	—	17.0	—	—	19.1	18.6	20.5
B.....	5.6	4.4	—	—	5.0	—	—	4.2	—	4.3	—	—	6.5	5.2	6.5
C.....	14.9	—	—	—	12.0	—	—	—	—	12.7	—	—	12.6	13.0	14.9
D.....	6.4	8.3	—	—	6.3	—	—	—	—	6.4	—	—	7.5	6.6	8.3
E.....	5.0	5.0	—	—	5.0	—	—	5.1	—	5.0	—	—	6.1	5.3	6.1
F.....	8.0	6.0	—	—	8.7	—	—	8.0	—	8.2	—	—	9.1	8.1	9.1
<b>11TH PREMOLAR—</b>															
A.....	20.7	—	—	—	15.0	—	—	—	—	—	—	—	—	17.8	20.7
B.....	5.5	5.0	—	—	3.2	—	—	—	—	—	—	—	—	4.6	5.5
C.....	15.2	—	—	—	11.8	—	—	—	—	—	—	—	—	13.5	15.2
D.....	6.7	8.3	—	—	5.7	—	—	—	—	—	—	—	—	6.9	8.3
E.....	5.0	6.5	—	—	5.4	—	—	—	—	—	—	—	—	5.6	6.5
F.....	7.6	7.0	—	—	7.4	—	—	—	—	—	—	—	—	7.3	7.6
<b>12TH PREMOLAR—</b>															

1ST MOLAR—													
A.....	—	—	20.5	17.2	20.2	—	*11.1	19.3	17.1	—	—	19.3	21.5
B.....	6.9	3.6	5.4	4.5	6.3	6.1	8.0	6.0	4.3	—	6.4	5.9	21.0
C.....	—	—	13.1	12.7	13.9	—	* 3.1	13.3	12.8	—	—	13.5	7.7
D.....	11.0	11.2	11.2	9.9	11.9	11.0	11.5	10.8	10.7	—	11.4	11.2	13.2
E.....	9.4	9.6	10.0	8.4	9.3	10.0	10.0	10.2	9.2	—	10.4	9.8	12.0
F.....	11.0	10.5	11.7	10.1	11.2	11.2	10.1	12.1	10.7	—	11.6	11.2	8.5
													10.3
													11.5
2ND MOLAR—													
A.....	—	—	20.0	17.2	17.8	—	—	—	—	—	—	18.9	21.0
B.....	6.9	4.1	6.2	5.1	6.1	5.2	—	—	—	5.1	6.4	5.8	19.8
C.....	—	—	13.8	12.1	11.7	—	—	—	—	—	—	12.7	6.9
D.....	11.0	10.4	11.8	10.0	11.3	11.3	—	—	—	10.8	12.0	11.5	12.9
E.....	9.6	10.0	10.5	9.0	8.6	10.1	—	—	—	10.0	11.6	10.0	10.7
F.....	10.7	10.6	11.4	10.2	10.2	10.9	—	—	—	10.8	11.4	11.0	8.1
													10.5
													10.1
3RD MOLAR—													
A.....	—	—	—	19.3	*12.6	—	—	18.1	—	—	—	18.7	19.3
B.....	6.2	5.7	4.0	4.7	6.0	5.6	—	5.3	—	—	6.3	5.5	18.5
C.....	—	—	—	14.6	* 6.6	—	—	—	—	—	—	13.7	6.7
D.....	10.1	11.4	12.3	10.3	11.1	11.1	—	12.8	—	—	12.1	11.3	11.8
E.....	9.2	11.1	11.1	10.1	9.7	10.2	—	10.8	—	—	11.5	10.4	10.7
F.....	10.5	11.5	11.4	11.3	10.1	11.0	—	11.1	—	—	11.1	11.0	8.3
													9.5
													10.5

\* This tooth just erupting.

Eskimo. Hrdlicka states that—"it is undoubtedly of functional origin the result of extraordinary pressure along the line of teeth most concerned in chewing." Hrdlicka advances no facts in support of his statement and consequently one may consider it as merely a plausible guess. While it may seem like temerity to take issue with so great an authority, nevertheless for several reasons, chiefly dynamical, I believe he is wrong. In the first place pressure on the teeth is met and counteracted, not by the sockets of the teeth, but by the resiliency of the tangential and other fibres of the periodontal membrane.<sup>(1)</sup> Only indirectly are the alveoli concerned. In the second place the pressure is greatest at and near its point of application, viz., on the molar series, and it is here that the reinforcement is either slight or wanting. In this region, too, in the maxilla, the roots of the teeth are in close relation to the floor of the antrum and there is no trace of thickening of that structure to withstand the pressure.

Lastly, in the premolar region where the bone development is greatest, if it be argued that the growth is due to inward lateral pressure on the teeth, then, since the pressure is equal and outward on the corresponding teeth of the maxilla, one would naturally expect a corresponding reinforcement on the buccal surface of the alveolus above these teeth; but such is not the case.

A critical study of the mandibles—all of adult age—where the alveolar reinforcement occurs, shows that not only the angles but the horizontal rami are strongly everted, the lower margin of each jaw forming a very symmetrical parabolic curve. The alveolar ridge of the horizontal rami consequently lies markedly to the lingual of the lower margins so that the teeth are suspended by means of the alveolar process *within* the jaw, whereas ordinarily they would be placed directly upon it. In other words, owing to the strained form of the mandible, from necessity the alveolar process has altered its position. It is no longer possible to arrange it and the teeth over the jaw proper without increasing the size of the arch to such an extent as to throw it out of proportion with the rest of the face.

With the beginning of eversion as a result of enormous development in the muscles of mastication concerned, the dynamics of the mandible have changed from normal. After studying the forces involved and their mode of action I have come to the conclusion that when the jaws are forcibly closed the horizontal rami are under a torsional stress which tends to evert the lower and invert the upper margin of the bone. This effect is greatest in the premolar region, and since the alveolar ridge is weakened by the sockets of the teeth a compensatory growth of bone is provided on the lingual alveolar wall in an effort to counteract the action of the powerful muscles involved.

There are other points of interest in the Eskimo dentition. The

lower second molar frequently carries five cusps and the third molar is occasionally so inverted that the upper half of the buccal surface occludes with the upper teeth. Variation, too, is not entirely absent in the Eskimo. Frequently the third molars vary appreciably in size on the two sides of the mouth, and in one case (F-1) the upper lateral incisors are congenitally absent. In this skull, too, the teeth are plentifully coated with tartar, probably due to disuse owing to an osteitis of the temporo-mandibular joints (see drawing of the glenoid fossæ).

F-19 is the mandible of a child, probably between five and six years of age. A close examination seems to indicate that the permanent teeth erupt rather earlier than is the case in the civilized races, where more extended observations have been possible.

According to Professor Todd <sup>(4)</sup> in the maxilla, "the distance between the outer borders of the second molar teeth in the English race averages 58 mm.; the length measured from a point between the upper central incisors to midway between the posterior borders of the third molars is 54 mm.; the area of the hard palate is about 2,600 sq. mm. The lower dental arcade has a length of 53 mm., a breadth between the outer borders of the third molars of 68 mm., and an area of 2,700 sq. mm." In the Eskimo the average breadth across the molars in twenty-two maxillæ measured, was 62.8 mm., the greatest measurement being 68.8 mm. The length of palate to the borders of the third molars, in nine specimens, averaged 44.3 mm.; the greatest being 53 mm., and the least 32 mm. In nine mandibles measured, the breadth at the third molars averaged 65 mm. and the length 51 mm. The areas mentioned by Todd may easily be calculated from the figures given and the area formula of the ellipse.

My thanks are due to Dr. J. Stanley Bagnall for his assistance in making measurements and compiling tables I and II, and in the taking of casts of the glenoid fossæ.

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# Osteology of the Western and Central Eskimos

MR. JOHN CAMERON.

IN the Report of the Canadian Arctic Expedition, 1913-18, covering the observations of the Southern Party regarding the Osteology of the Copper Eskimos, the author made a most comprehensive and scientific statement covering every phase of the question.

In the author's general description of the crania, a section upon "Mandibles" will doubtless prove of special interest to the dental profession. We quote that section in full:—

## MANDIBLES.

One of the first features that impressed the writer was the general massiveness of these Eskimo mandibles.

All the muscle markings were most pronounced, thus providing a suggestive reminder of the masticatory vigor of these individuals. Only in a few instances had the teeth been missing at death, for the alveoli as a rule were deep and their walls healthy. The angles were markedly everted. Indeed this eversion had in many cases involved also the lower halves of the rami, thus imparting a very broadened appearance to the jowls. The writer was much surprised at the obtuseness of the angles, considering that none of the individuals represented ages much above middle life. For example, the sizes varied from  $128^{\circ}$  to  $122^{\circ}$  in the adult males and from  $130^{\circ}$  to  $121^{\circ}$  in the adult females. Thus none of them approximated to  $90^{\circ}$ . The intergonial width was remarkably high, ranging from 128 mm. to 115.5 mm. in the adult males and from 114.5 mm. to 101.3 mm. in the adult females. These high figures were, of course, a natural result of the eversion of the angles. The highest intergonial measurement the writer could make in a collection of male European mandibles proved to be 111.3 mm. and this was well below the minimum for the male Eskimo series, as noted above.

One of the striking features of these Eskimo mandibles was the marked lowering of the posterior ends of the alveolar borders. This was much pronounced when viewed from the side. For example, in one adult male mandible the height at the symphysis was 47 mm. and this rapidly diminished in a posterior direction, until opposite the third molar tooth it was only 32.5 mm., representing a reduction of 31 per cent. This remarkable condition suggested to the author a new index for the mandible to which he has applied the term "*the index of height of the mandible in the molar region.*" The height in front is measured from the ridge between the alveoli of the

central incisor teeth to the lower border of the symphysis. The height posteriorly is taken from the inner edge of the alveolus of the third molar tooth to the lower border of the mandible. This measurement was always made on both right and left sides in these Eskimo mandibles, for it was ascertained that in only three cases did these heights agree on both sides. In the others there was always a slight difference, and in these, interestingly enough, the lowering was on the right side, except in two cases where it was on the left. This suggested of course that these Eskimos were accustomed to masticate more on the right side than on the left.

This new index was obtained by multiplying the height of the third molar tooth by one hundred and dividing by the height at the symphysis. The result of course represented the percentage height of the molar region. This proved a profitable investigation, for it produced not only interesting but also consistent results. For example, it was found that the index progressively diminished with age. This fact furnished an interesting sidelight on the masticatory efforts of the Eskimo, for it demonstrated that the terrific pressure to which the teeth were subjected forced the lower molar series more and more downwards during the period between adolescence and middle life.

On making a close analysis of this new index it was noted that the highest figure, namely, 91.4, was recorded in the mandible of a young adolescent female. The minimum (62.1) was found in the mandible of an adult female. The writer compared these results with the corresponding indices for ten European mandibles, where the maximum was 94.1 and the minimum 76.1, showing of course that the masticatory activity, and therefore the downward pressure upon the lower molar series, were not nearly so evident in these types of mankind.

This forcing downwards of the molar sockets produced an excessive broadening of the posterior portions of these Eskimo mandibles. Thus the distance between the inner border of the alveolus of the third molar tooth to the point on the external surface where the anterior border of the ramus joins the body was as much as 21.5 mm. in one adult male mandible, while the minimum (14.5 mm.) was found in an adolescent female. The corresponding maximum in a series of European mandibles was 18 mm. The general effect produced was to cause the sockets of the molar series to overhang the inner aspects of the mandibles to a pronounced degree. This feature of the Eskimo mandible has been already emphasized by Hrdlicka. (<sup>12</sup>) Indeed in some instances the bony thickening was excessive. For example, in one mandible the inward bulging of the bone was so marked that the transverse distance between the inner surfaces of the body opposite the first molars was reduced to 21.5 mm. This jaw had therefore an extraordinary appearance when viewed

from below. The writer would regard these bulgings as bone buttresses built up by nature to resist the excessive strain thrown upon the alveoli of the molar teeth. He exhibited the mandibles to Prof. H. E. Freisell, Dean of the Dental Faculty, University of Pittsburg, and this authority concurred in the opinion expressed above.

The writer has made a routine practice in his anatomy course of referring to a faint groove for the lingual nerve on the inner aspect of the mandible immediately below the last molar tooth, and has always expressed surprise that this is not described in standard textbooks of anatomy. These Eskimo mandibles all exhibited this important groove, which, indeed, was present in some cases to a pronounced degree. He would, therefore, put forward a plea for a fuller recognition of the clinical importance of this groove, seeing that there exists by no means a remote possibility of the lingual nerve being lacerated in a clumsy extraction of the third molar tooth.

The rami, in conformity with the bodies of the mandibles, were very massively developed and exhibited strong muscle markings. The author decided to experiment with a new index for the ramus to be termed "*the index of width of the ramus.*" To obtain this the width was multiplied by 100 and divided by the height. The length was measured from the bottom of the sigmoid notch to the lower border of the ramus in a direction parallel to the anterior and posterior borders. The width was measured from the centre of the slight concavity in the anterior border below the coronoid process and at right angles to the borders. The lines representing the length and width of each ramus thus intersected at right angles. It was found that the measurements varied for the right and left rami of each mandible except in one case. Thus in half the cases the right ramus was the wider, while in the others the left exhibited the greater relative width, suggesting varying masticatory habits of these individuals. The index of course indicated the proportion which the width of the ramus bore to its length. It was found to vary from 93.02 to 68.6, and, moreover, exhibited one consistent feature, namely—it increased with age in both sexes, up to middle life at any rate. There were no aged mandibles to illustrate the condition of the index in late life. The interpretation of these results obviously was, that the width of the Eskimo ramus increased with age in both sexes up to middle life. On studying this index in ten adult Anglo-Saxon mandibles, the maximum and minimum figures were 67.8 and 52.3, which were much below the Eskimo averages, thus demonstrating that the Eskimo ramus was relatively much wider than the Anglo-Saxon. On studying this matter further in European types of mandible, it was ascertained that the index of width of the ramus increased with age so long as the teeth remained intact, and then diminished again if the individual became edentulous. Altogether this comparative study

of these Eskimo mandibles provided some gratifying and suggestive results.

The mandibular condyles were so placed that their long axes converged upon the centre of the anterior edge of the foramen magnum as in the European type. Their articular surfaces were, however, slightly flatter in conformation with the more shallow character of the Eskimo glenoid fossæ.

Elsewhere in the report by Mr. Cameron appear the following observations regarding the influence of diet and mastication upon the evolution of the Eskimo type of skull. To quote:—

There can be no doubt that these lowly evolved types of modern man indulge in a very vigorous and unconventional type of mastication; thus encouraging their powerful temporal muscles to exert this constricting effect upon their skulls, and therefore lower their fronto-parietal indices. Note further, that the staple dietary of the Eskimo consists of raw or only imperfectly cooked food, so that their type of mastication must likewise be not only excessively vigorous, but also excessively unconventional. From the foregoing remarks it has become increasingly evident that the traction of the muscles of mastication on the lateral aspects of the cranium must exert a far-reaching influence upon its modelling and configuration—an effect which is probably not yet fully appreciated. The author would therefore like to put forward the theory that the type of mastication adopted by the Eskimo in negotiating his tough food has contributed, in no small measure, its effect in producing his characteristic type of cranium. This decision will however have to be confirmed by the examination of a much more extensive series of Eskimo crania, and this will require to be undertaken in the future, when the necessary facilities are obtainable. For this purpose the author would indeed be most grateful for the loan or presentation of crania belonging to this most interesting race.

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## 1924 Meeting American Dental Association

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THE 1924 meeting of the American Dental Association will be held in Dallas, Texas, from the 10th to the 14th November, 1924.

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SWAGING GOLD PLATES.—Use nitric acid, full strength for lead, then dip in fifty per cent sulphuric acid for zinc; allow to remain in each five to seven minutes when swaging gold plates. Oiling dies and counter dies, when swaging, will in a great measure prevent adhesion of the baser metals.—(T. F. Y., in *Dental Science Journal*.)

# Report of Committee on Dental Nomenclature\*

BY L. PIERCE ANTHONY, D.D.S., PHILADELPHIA, PA.,  
*Chairman of the Committee.*

YOUR committee begs to report as follows: In the report last year the committee set forth quite explicitly the objects and purposes of the committee, and while we have been criticized for not strictly adhering to our expressed purposes and objects, we feel that, on the whole, the work of the committee has met with general approval in the profession.

In some of the words we recommended last year, it seemed expedient to compromise with a strict interpretation of our declared course, and accept and recommend some words which have found permanent place in our literature by association and long usage, but which do not conform in the strictest sense to the demands of scientific nomenclature. We have not lost sight of the fact that usage is the most potent factor in the development of language, and for that reason we have recommended practically a *status quo* in the case of some words that are possibly not etymologically sound, but whose value and status have already been determined by usage.

For the most part, however, the objections raised have been mostly of a personal nature, by which we mean that individuals have objected to the use of a particular word because of some personal prejudice. And that impels us to repeat what we said in the last report, that personal prejudices will have to be subordinated if we are to make any progress toward the goal of a comprehensive nomenclature.

In this connection we wish to comment on a criticism of the work of the committee offered by the Committee on Nomenclature of the American Institute of Dental Teachers. In commenting on the report offered last year the committee of the Institute says, "the committee empirically states that these complicated terms (the list of words recommended last year) shall supplant the simpler and more commonly used forms," and the said "committee questions the propriety of the publication of any such mandatory list of terms unless the teachers and writers of this country have had an opportunity to express their opinion for or against their adoption."

Your committee disclaims any intention of mandatory action and is fully conscious of the fact that any action by the committee on the question of use of words, even though endorsed by the A.D.A., is subject to the approval of the individual. The committee was not conscious of promulgating an edict under the strong language of

\*(Presented to House of Delegates, American Dental Association, Cleveland, Ohio, September 10, 1923.)

"shall"; we merely recommended the use of words as preferable in our minds to those now in use, with no intention or thought of arrogating to ourselves any compulsory powers.

As to the propriety of publishing a list of words without first approval by the teachers and writers of the country, our definite conviction is that this approval or otherwise will in the nature of the case determine the final adoption of the words into our nomenclature. Conspicuous examples in proof of this assumption are found in the manner in which all previous reports of this nature have been received by the profession. The function of the committee, as we see it, is in a directive and suggestive capacity—the final status of any and all words to be determined by the usage of dental teachers and writers, as well as other members of the profession.

The action of the committee is not intended or desired to be as the laws of the Medes and Persians, and an example of this is furnished in the presentation this year of the word "pedodontia" to take the place of "pediadontia," offered last year. While pediadontia has been in use for some years and has become fairly well established, in deference to the action of the society representing this phase of dentistry, and because of its sounder derivation, we recommend the word they have unanimously adopted to designate the specialty that has to do with the treatment and care of children's teeth.

Much discussion has arisen during the year, calling for recommendations on the words "cast," "model," "articulation," and "occlusion."

With regard to the use of "model" in referring to the reproduction of the jaw in plaster or other material, we believe it to be in accord with the broad meaning and use of the term. A model is an object representing something to be made or something already existing—a material pattern of natural size or in miniature.

With regard to "occlusion" we feel that the word is gradually taking the place of articulation, the latter being acknowledged by all to be objectionable and incorrect in referring to the occlusal relations of the teeth. The Committee on Nomenclature of the old American Dental Association, as far back as 1896 recommended the substitution of occlusion for articulation, but it seems to have taken all these years for usage to finally begin to determine its status.

We offer for adoption the word "occlusion," with a more comprehensive definition, and also "articulation," to be used in a more restricted sense.

Some objection has been raised to the termination "clasia" to mean "breaking down," on the ground that the original Greek word "klassis" means to break, in the sense of breaking a twig or limb of a tree. This latter is its meaning, but it also means breaking up into parts, as the breaking up of a clod of dirt, and it requires little

literary license to allow its use in the sense we have used it. Our own application of the termination we believe to be in accord with its use in the well established words of osteoclasia, osteoclast, odontoclast, etc.

The word "buccal" we recommend to be used only as relating to the cheek, because of the confusion arising in its use in medical nomenclature when applied to the oral cavity as a whole and in dentistry as applied to the surface of teeth, according to Black's method of nomenclature.

There has for years existed considerable confusion in designating the inner and outer surfaces of the teeth of the denture as a whole. The word "lingual," adopted some years ago, serves the purpose so far as the inner surfaces are concerned, and we recommend the word "facial" to designate the outer surfaces of the teeth of the denture as a whole, in preference to the two terms "buccal" and "labial" when used jointly for this purpose.

It is not intended that the word "facial" shall supplant the words "buccal" and "labial," except to designate the buccal and labial surfaces of the teeth collectively.

We would again call attention to the careless use of the term "dead teeth" to designate "pulpless teeth." Recently there appeared in the *Journal of the American Medical Association* an article by a dentist, throughout which he referred to pulpless teeth as "dead" teeth. Dead teeth can have only one meaning to the medical man, and such careless use of terms on our part we believe to be largely responsible for the prevalent attitude of the medical profession toward so-called "dead" teeth.

There are other phases of our nomenclature than the suggested use of words that the committee would call to your attention. We would recommend that the careless method of indicating size by comparison with some commonplace object of indefinite size, such as the size of a hen's egg, a robin's egg, a pea, a walnut, etc., be abandoned, and size be specifically stated either in the English or metric system of measurement.

We would also recommend the following spelling of the words enumerated: gage, mold, dentin, disk, anesthesia, pyorrhea, septiceamia, pyemia, anemia, edema, etc.; in the case of the latter words because of the general tendency to drop the first letter in both the Latin diphthong "æ" and the Greek diphthong "œ," occurring in words other than as the termination.

We would again reiterate our conviction that there is no objection to the adoption and use of words of mixed Latin and Greek origin, in order that we may avail ourselves of the full advantage of these languages as the basis of our terminology; any other attitude would compel the abandonment of hundreds of words now in

use and the substitution of new ones that would add materially to the confusion already existing in our nomenclature.

LIST OF WORDS RECOMMENDED

- alveolectomy** (L. *alveolus* + Gr. *ektome*, excision). Excision of a portion of the alveolar process.
- alveolotomy** (L. *alveolus* + Gr. *tome*, *temnein*, to cut). Incision into the alveolus of a tooth, as for locating the end of a root of a tooth.
- anesthesia**. Preferable to *anaesthesia*.
- apicoectomy** (L. *apex*, gen. *apicis*, the end (of a tooth root) + Gr. *ektome*, excision). The operation of excising the end of the root of a tooth. To be used in preference to *apectomy*; *apicotomy*; *apicectomy*.
- articulation**. The arrangement of artificial teeth to conform to the requirements of the edentulous space or spaces which they are to occupy, and to adequately serve the purposes of the natural organs which they are intended to replace. *Note*: Articulation refers to the actual placing of artificial teeth, one by one, into the required position; but articulation is not to be used to describe the occlusal relations of artificial teeth after they have been so arranged.
- artificial denture**. A structure supplying missing natural teeth in whole or in part. To be used in preference to *plate*.
- bicuspid**. To be used in preference to *pre-molar*.
- bridgework**. A partial denture retained by attachments other than clasps.
- bridgework, fixed**. Partial dentures retained with crowns or inlays cemented to the natural teeth, which are used as abutments.
- bridgework, removable**. Partial dentures, retained by attachments which permit the removal of the denture. Usually the attachment is in two parts, one part being cemented to the natural tooth or its root and the other being a permanent part of the denture.
- buccal** (adj.) (L. *bucca*, cheek). Relating to the cheek. It is suggested that this word be confined to the above meaning. It is used now incorrectly, principally in medicine, to indicate the *mouth cavity*.
- calculus**, pl. *calculi* (L.): A stone-like or calcareous concretion formed in any part of the body. To be used in preference to *tartar*.
- casting** (n. and v.). *Noun*—A metallic object formed in a mold. *Verb*—The act of forming metal in a mold.
- cementum**. To be used in preference to *cement*.
- centric occlusion**. Contact of the teeth when the jaws are closed in the position of rest.
- cervical** (L. *cervix*, neck). To be used in preference to *gingival* as relating to the anatomical neck of the tooth.
- clasp denture**. A partial denture retained with clasps.
- conduction**. To be used in preference to *conductive*, as in conduction anesthesia.
- cuspid**. To be used in preference to *canine*.
- deciduous** (adj.). To be used as designating the teeth of the first dentition, in preference to the terms, *temporary*, *milk* or *baby*.
- dental** (adj.). (L. *dens*, *dentis*, tooth). Relating to the denture.
- dowel**. A metal post or pin used in attaching an artificial crown to the root of a natural tooth. To be used in preference to *pivot*.
- eccentric occlusion**. Contact of the teeth in the excursive movements of the mandible.
- endocrinodontia**. (Gr. *endon*, within + *krinein*, to separate + *odous*, tooth). The study of the internal secretions in their relations to the teeth.
- facial** (L. *facies*, face). Term to be used to designate the outer surfaces of the teeth collectively.
- first molar**. To be used in preference to *six-year molar*, or *sixth-year molar*.
- fissure**. A fault in the surface of a tooth caused by the imperfect joining of the enamel of the different lobes. To be distinguished from a groove or sulcus.
- full denture**. A structure replacing the full number of natural teeth of both jaws.
- functional occlusion**. Such contact of the teeth of both jaws as will provide the highest efficiency during all the excursive movements of the jaws which are essential to the function of mastication, without producing trauma.

**malocclusion.** Such malposition of the teeth as will interfere with the highest efficiency during the excursive movements of the jaws which are essential to the function of mastication. This would not necessarily indicate a lack of occlusal contact when the jaws are closed, nor would it always indicate traumatic occlusion.

**mandible** (L. *mandibula* from *mandere*, to chew). The lower jaw.

**maxilla** (L. *maxilla*, jaw). One of the upper jaw bones.

**maxilla** (pl.). The upper jaw bones as an anatomical unit, or the upper jaw as opposed to the lower.

**maxillary** and **mandibular teeth.** Terms to be used, if desired, in referring to the teeth of the upper and lower jaws respectively.

**mesial** and **distal.** These terms as used today have been objected to as not being in conformity with anatomical nomenclature, where they are used to indicate relation to the median line of the body. They have, however, become so fixed in dental nomenclature that we do not suggest any change.

**morsal** and **occlusal** (adj.). To be used synonymously as relating to the masticating surfaces of the bicuspid and molar teeth.

**normal salt solution.** A 5.84 per cent solution of sodium chlorid in distilled water. This should be distinguished from *physiologic salt solution* which is a 0.6 per cent solution of sodium chlorid.

**occlusion** (L. *occludo*, to close, to shut). The contact of the teeth of both jaws when closed or during those excursive movements of the mandible which are essential to the function of mastication.

**occlusal embrasure.** The space between the marginal ridges of approximating teeth, mesially and distally, and the point of contact and the occlusal plane.

**odontotomy** (Gr. *odous*, tooth + *temnein*, to cut). The operation of cutting into the tooth structure.

**partial denture.** A structure supplying less than the full number of teeth in one jaw.

**pathodontia** (Gr. *pathos*, disease + *odous*, tooth). That branch of dentistry which has for its purpose the study and treatment of diseases of the teeth.

**pathology** (Gr. *pathos*, disease + *logos*, treatise). That branch of medical science which treats of morbid conditions, their causes, symptoms, etc. This term is being used to indicate a disease or pathologic condition, which is confusing, unnecessary, and undesirable.

**pedodontia** [pe-do-dont-ia] (Gr. *pais*, *paidos*, combining form *pedo-*, child + *odous*, tooth). That branch of dentistry which has for its purpose the study and treatment of children's teeth. To be used in preference to *pediadontia*.

**pedodontist.** One who practises pedodontia.

**pericementum.** The membranous tissue immediately surrounding the cementum of the tooth and between the cementum and the alveolar process. Preferable to *periodontium*.

**periclasia** (Gr. *peri*, around + *klassis*, breaking (down).) Used as a shortening for convenience of periodontoclasia. Should be used with a qualifying word, as in itself it does not mean anything in particular.

**periodontal** (Gr. *peri*, around + *odous*, tooth). Relating to the alveolo-dental ligament. To be used in preference to *peridental*.

**periodontia** (Gr. *peri*, around + *odous*, tooth). That branch of dentistry which has for its purpose the study and treatment of diseases occurring around the teeth and their roots.

**periodontoclasia** (Gr. *eri*, around + *odous*, tooth + *klassis*, a breaking (down).) The destructive degeneration of the tissues about the root of a tooth. Substituted for *pyorrhea alveolaris*; *Riggs' disease*; *interstitial gingivitis*.

**physiologic salt solution.** A 0.6 per cent solution of sodium chlorid in distilled water. This should be distinguished from *normal salt solution*, which is a 5.84 per cent solution of sodium chlorid.

**pontic** (L. *pons*, *pontis*, a bridge) (adj. and noun). A substitute for a natural tooth. Used in preference to *dummy*.

**prosthesis** (n.) (Gr. *pros*, to + *tithenai*, to place). Preferable to *prothesis* (Because of the more definite application of the Greek preposition *pros*, as compared to *pro*, in this form.)

**prosthethics** (n.) Preferable to *prothetics*. (For same reason as in prosthesis.)

**pulpless tooth.** To be used in preference to "*dead tooth*," "*devital tooth*," "*devitalized tooth*." In cases where there is a "*vital*" pulp in a tooth or a

- "non-vital" pulp, it should be so designated ; *e.g.*, a tooth with a vital pulp, or a tooth with a non-vital pulp.
- radiogram** (n.) (L. *radius*, ray + Gr. *gramma*, a writing). The product or tangible result, as the film or the print thereof, of the radiographic process, actuated by radiant energy of whatever source.
- radiograph** (v.) (L. *radius*, ray + Gr. *graphin*, to write). The act or process of making a radiogram.
- radiographer**. One skilled in the art of making radiograms.
- radiography**. The art of making radiograms.
- radiology** (n.) (L. *radius*, ray + Gr. *logos*, treatise). The science of radiant energy. To be used as the generic term to indicate radiant energy from whatever source.
- radiolucent** (L. *radius*, ray + *lucere*, to shine). Term applied to substances that allow the passage of radiant energy light, but offer some resistance.
- radiopaque** (L. *radius*, ray + *opacus*, shady). Term applied to a substance that is impermeable to the various forms of radiant energy.
- radioparent** (L. *radius*, ray + *parere*, to appear). Term applied to substances that freely transmit the light of radiant energy.
- Roentgen ray**. To be used in preference to *x-ray*, and only where the specific ray is indicated.
- roentgenogram**. The shadow picture produced by the Roentgen ray on a sensitized film, or the print from the film.
- roentgenograph** (v.). The act of making a roentgenogram.
- roentgenographer**. One skilled in the art of making roentgenograms.
- roentgenography**. The art of making roentgenograms.
- roentgenology**. The study and use of the Roentgen ray in its application to medicine and dentistry.
- second molar**. To be used in preference to *twelve-year molar*, or *twelfth-year molar*.
- sialosis** (Gr. *sialon*, saliva + *osis*, a condition of). The flow of saliva.
- sialotic** (adj.). Relating to sialosis.
- sulcus**, pl. *sulci* (L.). A long shaped depression in the surface of a tooth, the inclines of which meet at an angle.
- third molar**. To be used in preference to *wisdom tooth*.
- traumatic occlusion**. Such contact of the teeth of both jaws as would induce trauma during centric or eccentric occlusion, because of malposition of the teeth or disarrangement of the occlusal planes.
- Vincent's infection**. To be used to express the ulcero-membranous stomatitis caused by Vincent's spirillum and fusiform bacillus in preference to *Vincent's angina* ; the latter being more applicable to the throat infection.
- x-ray** (n.). This word is used indiscriminately as noun and verb. It should not be used as a verb. The word Roentgen ray is preferable. It should also be used with the small x rather than with the capital letter X, if used at all.

In concluding the report the committee would again earnestly solicit the co-operation of all committees representing the various specialties of dentistry, as well as all dental societies and individuals, to the end that progress in this department be apace with that so apparent in all other phases of dentistry.

Respectfully submitted.

L. P. ANTHONY, *Chairman*,

C. N. JOHNSON,

R. OTTOLENGUI,

OTTO U. KING,

C. E. WOODBURY,

*Committee.*

[NOTE. The report was accepted, and upon recommendation of the Reference Committee of the American Dental Association the words offered in last year's report are included in this, in order to bring the work of the Committee on Nomenclature up to date and centralized in one report.—L. P. A.]

# The Causes and Effects of Mouth Breathing\*

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THE effects of mouth breathing develop so slowly and so insidiously that this cause of poor physique, in spite of its frequent occurrence, does not appear to have received the attention it deserves. Nevertheless mouth breathing has contributed very largely to the formation of the round shoulders, flat chests, deformed jaws with bad teeth, and is accompanied by nasal obstruction with its attendant catarrh which contributes to the defective physique so commonly seen in many rejected army recruits or recruits of low category. If baby shows were extended to adults it is certain that no inveterate mouth breather would be judged worthy of a prize for physical development and perfect health or beauty. The presence of signs of mouth breathing will also help to decide the necessity for operation in doubtful cases of nasal septum deformity or for the removal of tonsils and adenoids.

The cause of persistent mouth breathing is not by any means confined to the obvious one of nasal obstruction. Nasal obstruction in young subjects is rarely complete but is more commonly intermittent and partial. For example, an adenoid growth in a child does not produce obstruction during the day when in the erect posture, and it is only at night during sleep that stenosis, rather than complete obstruction occurs. Similarly, deformity and deviation of the nasal septum produces a partial and sometimes intermittent obstruction according to the condition of the mucosa of the inferior turbinated bones. In a warm, moist, or vitiated atmosphere the inferior turbinals become relaxed and engorged to diminish the amount of air passing through the nose; in a cold, brisk atmosphere the turbinals contract and nasal respiration becomes free and complete. In the mouth breather, this function of the nose is in abeyance and a vicious circle is established in which the turbinals become permanently engorged and lose their power of contraction and eventually become hypertrophied producing chronic nasal obstruction and an unhealthy state of the nasal mucosa. This variation of the nasal mucosa often makes nasal obstruction intermittent, and such a patient may have a free nose at the time of examination, and the cause of the mouth breathing is not then evident, but the history of the patient will reveal symptoms of nasal obstruction particularly at night.

Habit is the commonest cause of mouth breathing and is difficult to cure even when the nasal obstruction has been eliminated. Con-

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firmed mouth breathers are frequently seen who have perfectly free and patent noses in which there has never been any nasal obstruction; for example, the imbecile, with his open mouth but, strange to say, well developed jaws and broad free nose. In others, though the cause of the nasal obstruction has been removed by operation some years previously, they still remain mouth breathers. Again, there are some cases of mouth breathing in which there is a short upper lip and an open bite in which there is no nasal obstruction, but in repose the mouth remains open and can only be kept closed by a distinct effort on the part of the patient. Mouth breathing is thus sometimes due to an open bite and will persist until the open bite has been corrected.

Occasionally infants are seen who cannot suckle without difficulty and without frequent pauses to breathe through the open mouth, and if there is no other reason for this apparent nasal obstruction the pharyngeal tonsil, or so-called adenoids, has been scraped. For my own part, I am not quite sure that this is the real cause of such inability to suckle and it is feasible to suppose that these infants may have the same difficulty in carrying out this co-ordination of muscular action that older children have in blowing the nose. Moreover if the adenoid tissue is hypertrophied it is probably a temporary enlargement such as is known to occur during the first dentition. An infant who is allowed to lie and sleep on its back and is not placed in the correct position on its side, develops the habit of mouth breathing because, when relaxed, the lower jaw tends to drop by its own weight. It is probable that early and persistent nasal obstruction results in a want of development of the width of the floor of the nose, the antra, and maxilla, hence the difficult case with the pinched, narrow nose with sucking in of the *alae nasi* and poorly developed maxilla. It may be of value to know what is the normal width of the nasal fossa at certain ages compared with that of the maxilla. Such measurements can be taken by callipers, and in cases in which expansion of the maxilla is being carried out any increase in the width of the nose can be estimated. The development of the nose and jaws is closely associated and probably inter-dependent, but it is not so certain as to which is the primary cause of the irregularity in spite of the fact that clinical evidence frequently condemns the nose. Looking at this skull which has particularly well developed normal jaws and nose the orthodontist would say "what a free, broad nose; no wonder he has good jaws," but the laryngologist would reverse it and remark "what a good well developed maxilla; no wonder he has a good nose."

Deformities and irregularities of the shape of the jaws and position of the teeth are due to a combination of causes of which nasal obstruction is undoubtedly a contributory and active factor, and cer-

tainly increases any existing deformity. It is generally accepted that the muscular action of the tongue, cheeks and lips has a direct influence on the moulding of the jaws, and this action is disturbed in mouth breathers; also it is admitted that orthodontic treatment of deformities associated with nasal obstruction fails, owing to relapse, unless nasal breathing is established.

The shape and size of the jaws and position of the teeth is often hereditary and racial. For this reason, there are several types of normal jaws which are in conformity with the contour of the head and face, and typical of the race or nationality of the subject. The inferior protrusion on the undershot jaw, though increased by a defective occlusion, the absence of lateral incisors, and the diastema between the central incisors, are inherited. The long, narrow jaw of the Gold Coast negro, and the square, rounded jaw of the European, are racial. There have been slight differences of opinion as to what is the type of normal jaws, but for practical purposes and from my own observations, I would define those jaws as normal in which the arches are round and symmetrical with the teeth in line and almost an edge to edge bite, with slight overlapping of the upper incisors. I have seen many patients who are undoubted mouth breathers, but have no deformities of the jaws, and I have records of several cases of neglected adenoids with septum deformity and nasal obstruction where the jaws are well developed and normal. Conversely, deformities have been present in patients who have perfectly free noses, are not mouth breathers, and have no flattening of the chest; and in others who have had tonsils and adenoids efficiently removed before the age of 6. (Illustrated by models.) I have the records of a patient with atrophic rhinitis which commenced in childhood, and who has superior protrusion and an open bite similar to that seen in cases of nasal obstruction. J. G. Turner reports that children who have worn tracheotomy tubes for prolonged periods do not show any abnormality of the jaw. It is also remarkable that in the few recorded cases of congenital occlusion of the posterior nares, which is nearly always unilateral, there were none of the deformities usually associated with mouth breathing and nasal obstruction. From the above facts it can be claimed that nasal obstruction does not produce a simple and direct mechanical action on the mouth, but I think that all will admit that it plays a contributory part.

The type of deformity associated with mouth breathing becomes definite about the age of 6, but the want of development can be recognized even at an earlier age by the absence of the spacing of the temporary teeth with little room for the eruption of the permanent teeth, and this is followed when the first molars are erupted by a post normal occlusion leading to the absence of edge to edge attrition of the incisors. Finally, the deformity of the jaws seen at a later age is the narrow maxilla with lateral compression and the resulting high

palate and superior protrusion forming what is known as the V-shaped jaw, or gothic arch. It may be accompanied by the open bite as the result of the compression lowering the alveolus of the upper molar and bicuspid region, or possibly by the protrusion of the tongue between the teeth. The mandible sometimes shows depression of the molars exaggerated by the elevation of the incisors of the mandible which may occlude with the palate instead of the maxillary teeth. (Illustrated by photographs and models.)

Open bite not only prevents efficient mastication, but the want of use of the incisor teeth increases the marginal gingivitis already present as the result of mouth breathing, and, hence, probably arises early pyorrhœa alveolaris. In emphasis I would repeat that this type of patient will always be a mouth breather until the open bite is corrected.

My clinical experience coincides with M. H. Cryer, who found that the high palate is not always associated with congenital nasal septum deviation, and, conversely, a congenital septum deviation is frequently seen in patients in which the palate is flat and well rounded. The maxilla, as you know, forms the greater part of the nose, and particularly the floor of the nose, which is most concerned with respiration, and I am sure that deformity and cramping of the maxilla produces a narrow, obstructed nose, and it is here that the orthodontist can help the rhinologist by developing the maxilla, and one looks forward to greater co-operation and team work between the orthodontist and rhinologist in this respect.

The mouth breather of long duration possesses the thin, narrow, poorly-developed nose with the sucking in of the *alae nasi*, and it is in this type of case that the results are so well shown by the early morning dry mouth and headache, the want of tone and clearness of speech, with its disadvantage to the singer; also the susceptibility to catarrhal and middle ear deafness, the congestion of the fauces and pharynx, sore throats, laryngitis, and the obvious detrimental effects on the chest. This type of patient is susceptible to catarrhal attacks and suffers from frequent and prolonged colds with the inevitable loss of time and work due to sickness. The effect on the development of the chest is most important. The round shoulders, the flat, shallow chest and depressed infraclavicular regions and the winging of the scapulæ are characteristic. This deformity is increased in rickets, but it can be distinguished from the pigeon breast, the Harrison's sulci below the *mammæ* accentuated by the eversion of the costal margins and the funnel-shaped chest which are due to the pull of the diaphragm on the soft ribs, and even these rickety deformities are considered to be increased by mouth breathing. The deformity of the chest, with its shallow breathing and want of expansion, with frequent catarrhal attacks, is undoubt-

edly a predisposing cause to pulmonary tuberculosis and bronchitis, and the effect on the general health is obvious, but the mechanical reasons for such deformity of the chest produced by mouth breathing are not so easy to explain, and it is to be noted that in cases of laryngeal obstruction due to a congenital web of the larynx, congenital stridor, papillomata, etc., there is no deformity of the chest.

It is difficult to estimate how much mouth breathing and nasal obstruction affect the mental development, but the open mouth, with flat chest and thrusting forward of the face, with the occasional hardness of hearing, always gives the impression of a want of intelligence and alertness.

The treatment of mouth breathing is carried out on the following lines:—

- (i) Nasal obstruction, if present, should be corrected as early in life as possible. Nasal obstruction should not only be detected by the tests such as holding a feather or flake of cotton wool in front of the nostrils, but by the presence of mouth breathing during exercises.
- (ii) Breathing exercises to promote nasal breathing and to expand the chest.
- (iii) Early correction of open bite and superior protrusion, with appliances to correct the habit of mouth breathing and snoring. (I know of no better or more successful appliance than the mouth screen devised by Mr. Warwick James.)
- (iv.) The late case with the thin, narrow nose with *ala* collapse is a most difficult type to improve or cure, and a forlorn attempt to increase the width of the nasal cavity by a dental appliance which expands the maxilla and opens the intermaxillary suture has been attempted.

In conclusion, the modern orthodontist, if given an early opportunity, can mould and train the growth of the jaws like a gardener trains a tree. He is also in a position to detect mouth breathers at an early age, and, in co-operation with the rhinologist and drill sergeant, he is able to render a great service by improving the physique of the nation.

#### REFERENCES.

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#### DISCUSSION.

The President said the Society was very much indebted to Mr. Davis for his Paper, which was of very great interest and contained much food for thought. There must be many members present who

held views upon mouth breathing, which was almost the basis of orthodontics in many respects. He should like to ask the author what he regarded as the earliest age at which mouth breathing occurred. It had been said that adenoids occurred in a pre-natal condition, as had been found in hospital practice, and it would be interesting to know at what age the greater number of patients usually developed obstruction. The author had said that habit was the commonest cause; if that was so, he placed the breathing through the mouth before the obstruction of the nose. In discussions which had taken place between those practising dentistry and rhinologists the matter was argued by one party in one way and by the other in the reverse way. He thought the majority of people up to recent times would have said that nasal obstruction was the primary factor. He himself thought that mouth breathing might precede the obstruction of the nose. The term "mouth breathing" was one which was used rather indefinitely. If the lips were apart, although the mouth was not actually used for the passage of air, the patient would still be called a mouth breather because it presented the deformities which occurred by the action of the cheeks and the absence of the action of the tongue. Such patients might be almost called patients with lips apart. There were cases which showed almost complete nasal obstruction and the mouth must necessarily be used for respiration, but the majority of cases, he believed, would be classed as partial obstruction of the nose. There were cases where the lips were kept apart where the nose was quite free, and he should like to know in what proportion those cases could be grouped.

Mr. W. J. MAY referred to enlarged glands that sometimes occurred in the neck of children when there was no apparent cause and no septic teeth, and as far as could be seen the throat was free from obstruction and the tonsils normal, but the children still had enlarged glands and he should like to ask the author's opinion as to the exact significance of those glands, and also whether he had any statistics to show what proportion of the glands were tubercular. He had read that of tonsils removed, some three or four per cent. were found to be tubercular. How many glands, even the smaller ones, were found to be tubercular?

Mr. A. T. PITTS said the subject was one of tremendous interest and perhaps of more importance than anything else to the orthodontist. He was glad the author had laid emphasis on the fact that the relationship between mouth breathing and deformities of the jaw was not such a simple one as was often suggested. Very often dentists made the relationship much too simple, assuming that as the floor of the nose was the roof of the mouth, the two were connected and varied directly. It always seemed to him that there must be some other additional factors, because at different times nearly all the deformities of the jaws were said to be due to mouth breathing.

Cases of post-normal occlusion or excessive overbite were said to be due to mouth breathing but the author suggested there might be some other factors, and it seemed to him also that there might be certain other factors which co-operating with the mouth breathing would show why, in some cases of mouth breathing, there was marked deformity and in others not. Mr. A. J. Wright, of Bristol, recently reported a case of two sisters with bony occlusion of the posterior choanæ and they had had mouth breathing from birth. He said that the jaws were quite well formed, and went on to suggest that possibly partial obstruction might be a greater factor than complete obstruction. Where there was mouth breathing due to enlarged tonsils and adenoids there might be pathological factors coming in, whereas in cases of occlusion of the choanæ, the element of infection might be absent. Lawson Dick, in his most interesting book on rickets, attributed a very large number of defects of the jaws to that condition. He thought that rickets, in conjunction with nasal obstruction, which might lead up to adenoid vegetations, had a profound influence in modifying the shape of the jaws. Those changes in the jaws which Sir Arthur Keith had suggested were due to an evolutionary factor, were, according to Dick, much more likely to be due to rickets which he regarded as the cause behind the nasal obstruction accounting for deformities of the jaws. With regard to the point made by the author as to the effect of mouth breathing showing itself by absence of spacing of the incisor teeth, it was interesting to know that Wood Jones in his book on "Arboreal Man," referred to that subject and considered that the absence of spacing, which was very often met with, might be an evolutionary factor due to the progressive diminution of the jaws owing to their lack of functional vigor as compared with more primitive types. With regard to inheritance of the conditions associated with mouth breathing, he knew of a case of a father and two sons who both had superior protrusion with post-normal occlusion, with narrow noses. Was that due to an environmental condition, or was there in such a case a true inheritance, and if there was a true inheritance was there any possibility of trying to effect any improvement by orthodontic treatment? With regard to the age at which the cases came in, he had had one child of about three years of age, with extremely marked superior protrusion and post-normal occlusion, and he was inclined to think of mouth breathing as a cause. That was the earliest case he had seen. Mouth breathing under some conditions was physiological. In violent exercise the mouth was kept open. Especially was that the case in running, and dogs like the greyhound breathed through their mouths at that time. It would not seem that mouth breathing always brought with it the long trail of disabilities attributed to it. Some time ago there was an article in the *Lancet* on the condition of the mouth in airmen, and the statement was made that some of the airmen were mouth breathers

and did not appear to suffer in any way from ill effects. Had they been examined by a dentist some results of mouth breathing might have been detected. With reference to the definite effects of gingivitis, there was one point which Mr. James and himself brought up in a paper some time ago, namely, denudation as a factor in eruption, and it was thought then that undoubtedly in mouth breathers the denudation of the incisor teeth might be incomplete and that therefore that might be a predisposing factor to pyorrhœa later on. With regard to treatment he was glad that the author had spoken of the oral screen, because although that was familiar to most dentists it did not seem familiar to medical men. Most of the rhinologists he had spoken to had never heard of it; yet he was convinced that it should be a most important ancillary treatment of the conditions and rhinologists would find it very useful. The very earliest case he had had was a little child of three years of age who had mouth breathing, but not nasal obstruction, because the adenoids had been removed. The child used to get a discharge of blood from one nostril at night. With considerable difficulty he took impression and made a mouth screen of aluminium, and after some trouble he got it into place and told the mother what to do. A fortnight after the child was brought to him in the out-patient department peacefully sleeping with the instrument in place and he was told that the discharge of blood had stopped at night. He thought that where it was considered that the instrument should be used in connection with a mouth breathing habit, before doing so the child should be examined by a rhinologist to see the condition of the nasal mucosa and to judge of the effect, if any, induced by a cessation of mouth breathing. In cases where mouth breathing existed it would be extremely interesting to be able to estimate the condition and then see later what changes, if any, were induced by a return to nasal respiration at night. Neurologists were very fond of quoting a high palate as a stigma of degeneracy. He had often been puzzled by that and had tried to track it down to its source, without any success. Neurologists did not seem to be able to say how it came about. There were many cases of high palate, and he found it very difficult to imagine a high palate could be considered a sign of degeneracy. It seemed to him that the best explanation might be that in such cases a high palate might be associated with adenoids, when the children were deaf and cut off from the stimulation which children with normal hearing had, and therefore became stupid and that became stereotyped into definite mental defect, and for that reason the palate was put down as being one of the stigmata. He did not think there was any causal relationship. It seemed to him that if the neurologist would consult the dentist better information might be obtained on that point.

The PRESIDENT, referring to the question of habit, said at one time he collected a large number of cases where thumb sucking and

habits of that kind were common in very early life, and he had frequently thought that that might be a factor in the production of mouth breathing. There must be some factor of that sort if mouth breathing be the primary factor and not nasal obstruction. It might be merely habit. He had also wondered whether children who had too many bed clothes adopted the habit. A child with a high temperature would frequently open its mouth to breathe and there seemed to be some effort at respiration. In his own children he noticed that if they became hot at night, and had too many bed clothes, they turned on to their backs and lay with the mouth open. The loss of heat which occurred in animals might apply to human beings; they might like to get additional moisture through the mouth instead of up the nose.

Mr. W. RUSHTON said that years ago orthodontists used to think they knew something about the cause of mouth breathing, but they were getting more and more puzzled and the subject became more enigmatical and complex as time went on. Formerly it was said: "If you close your mouth you will find the tongue absolutely fills the oral cavity; therefore you have the muscles on the outside more or less exercising their influence, counteracted by the muscles of the tongue on the inside, and if these two are in equilibrium you have a properly moulded arch." It seemed to him a most rational thing to believe, but the author and others say that there are many cases in which we do not get contracted arches supposed to belong to the typical mouth breather. When the mouth is kept open the tongue naturally drops to the floor of the mouth. The muscle of the tongue therefore exercises no countervailing force in the upper jaw, but it does in the lower jaw. In one of the photographs that had been shown there was a very narrow vaulted maxilla and a very finely developed mandible, which seems to bear out the theory. The theory was so absolutely reasonable, that one was rather disinclined to throw it aside without finding something else to take its place and he should like to ask the author whether he had an equally satisfactory theory to bring forward. Mr. Pitts had mentioned the case of a child of three in which he saw very marked superior protrusion, and the President had mentioned that there were many cases of thumb sucking. It seemed to him that many cases of thumb sucking simulated mouth breathing, but thumb sucking and mouth breathing were mutually antagonistic because it was not possible to suck the thumb and breathe through the mouth at the same time, or at least with any pleasure. With regard to the age at which adenoids came, he had seen a young mother that very morning, who told him that her newly-born baby had to be operated on for adenoids because the doctor said the child was born with adenoid obstruction and that the sooner the operation was performed the better. He was wondering if that were true. He wondered if nature so far forgot herself as to start a human

being in the wrong way like that. One thing quite certain was that, as so-called civilization advanced, the shape of the face and the shape of the jaws were very profoundly modified. Once upon a time he had a great interest in going through the pictures of many of the old Royal houses, particularly the Hapsburgs and the Medici. Both those families started all right with well-developed heads and jaws, but as centuries passed by, the type of head and face entirely changed and some of the later representatives of those houses, instead of having fine broad, well-developed features, had narrow, long, typical adenoid mouth-breathing faces. Typical instances could be seen in portraits of our King Charles II. and King James II. who were descended from the house of Medici, and he should say that, in that house and in the house of Hapsburg after a time, the predisposition to that condition became hereditary. That could be seen in the portrait of the present King of Spain, whose children he believed had been under treatment for that same sort of thing. The author considered that habit was the commonest cause of mouth breathing, and the question arose what was habit? He would define it as something which tended to proceed on the line of most comfort or least resistance. Nature, he thought, intended man to breathe through the nose and that was a natural habit. If for any reason there was any discomfort in that habit, another habit was taken on because that was the line of least resistance. He thought Mr. Davis must find some other reason. In conclusion, he thought it an excellent thing when a gentleman who had taken the L.D.S. had gone into another branch so closely allied with dentistry. It was in the mutual interchange of thoughts on such subjects that something would be finally reached in the way of an increase of knowledge.

Mr. PITTS said he had excluded thumb sucking in the case he mentioned.

Mr. J. W. MAYER said the author had mentioned that he had used the anti mouth-breathing apparatus, and he himself had also used it, but did not seem to be very fortunate. Most of the people he had asked to wear it had had so much difficulty that they were inclined to give it up without taking any further trouble. One doctor had used it and had become weary with it. He himself had used the apparatus which was demonstrated by the President, a soft rubber apparatus, and he should like to know if the author found that he obtained universal satisfaction from the apparatus?

The PRESIDENT said at times there was undoubtedly great difficulty in inducing people to wear it, and it depended a great deal on the age of the patient. If a person had been breathing through the mouth for a great number of years, it was a habit exceedingly difficult to break. It was only by persistence that the result could be achieved, and he did not think it could be achieved in all cases, but in a number of cases extraordinary results were obtained.

Mr. GEORGE THOMPSON asked whether there was any connection between deformities and breast feeding or bottle feeding. He thought the breast-fed child brought up in a healthy environment might suck its thumbs or do anything else, and the bones would not be influenced in any way.

Mr. H. CLARKE asked whether if a patient about the age of thirteen or fourteen came with nasal passages that had been well cleared, and without evidence of mouth breathing, but with an open bite and a very narrow upper arch and a fair lower arch, with considerable spaces between the teeth, and by orthodontic treatment the appearance of the deformity could be corrected, the patient would benefit to any marked extent; was there going to be very considerable improvement in the health, or was there very little to be hoped for with regard to general physical condition?

Mr. PACKHAM said several wearers had told him that their night's rest would be disturbed without the use of the mouth valve, and that seemed curious. One patient of his asserted that he could cure an on-coming cold by wearing the mouth valve for two or three nights. With regard to classification of mouth breathers, some mouth breathers were really mouth breathers, and others, although they had the lips apart, were not mouth breathers at all. The question was a very important one, and he agreed with the author that the correction of the open bite was one of the most important factors in correcting the habit of mouth breathing. If it was impossible for the lips to be closed, as was very often the case with children where the lower lip was inside the upper incisors, he took it that until either the lower jaw was advanced or the upper incisors retracted, the two lips could not meet and the mouth breathing would not be stopped.

Mr. S. WILSON CHARLES said he agreed with Mr. Rushton that thumb sucking and mouth breathing never went together. He had a baby at the present time who sucked her thumb, and as soon as she went to sleep took the thumb out of her mouth. He had tested her every night for the last week and she breathed through the nose. When she started a cold she breathed through the mouth. Another child invariably breathed through her nose when she was sucking her thumb, and at other times breathed through her mouth; as soon as she took her thumb out she breathed through her mouth.

Mr. RUSHTON said that with regard to a child whose lower lip was always behind the upper teeth the same rule applied; children could not breathe through the mouth and keep their lips in that position.

Mr. W. KELSEY FRY said it would be interesting to know the easiest way to get rid of the open bite, whether it could be done by exercising the lips. He had had a little experience in plastic work and had found that by exercise the lips could be stretched enorm-

ously, and he was wondering whether a little exercise would be of value in orthodontics.

The PRESIDENT said he had quite a large experience of thumb sucking and other forms of sucking, and he believed the deformity that was produced defeated the very point Mr. Rushton had made that the tongue and the lips occupied the space. There was an actual space created between the incisors. It did not occur in all thumb suckers, but if they apparently bit with a repeated action of the mandible the deformity was greater. If the jaws lay passively in position it apparently did not produce a deformity. He had found definite thumb sucking with no deformity, and he had come to the conclusion that it was a muscular action which produced the deformity and the space created between the incisors permitted air to enter both through the mouth and the nose and in due course the mouth breathing habit could be created. If a child closed its lips where deformity had been produced, the lower lips came under the incisors and acted as a cushion, increasing the deformity, and mouth breathing was probable.

Mr. RUSHTON asked whether sufficient air could be got between the teeth to satisfy the lungs?

The PRESIDENT did not think it was necessarily so, but some air passed through the mouth and some through the nose, and it was only necessary to establish nasal catarrh for mouth breathing to occur.

Mr. PITTS asked whether it was possible to breathe through the nose and mouth simultaneously.

The PRESIDENT thought it was certainly possible.

Mr. DAVIS, replying to the discussion, said he had not the same confidence that he had when he started. It was a very difficult subject and there had been many questions difficult to answer. The President had spoken about the earliest age in which mouth breathing occurred. Mouth breathers were brought with a diagnosis of adenoids, the mother bringing the child along to have its adenoids removed. Just before the war he collected notes of about 1,061 tonsil and adenoid cases that he had done, and he looked through them to see the number of children from whom he had removed adenoids under the age of two, and there were only four or five. The majority of children who had tonsils and adenoids removed were considerably over two years of age. Therefore he did not think that mouth breathing in children was really very common, yet Mr. Jones, of Birmingham, said he had removed adenoids in a large number of cases of infants who were unable to be suckled. Such cases were not seen by him. He had several colleagues at work at the Children's Hospital, and they said that they removed adenoids but that they did not know that it made very much difference. Even Lack would not admit that an adenoid growth was congenital. A child was born of course with a pharyngeal tonsil, which became hypertrophied, but he said

children were not born with enlarged tonsils. It was difficult to say whether the mouth breathing started first or nasal obstruction, but he was rather inclined to think that nasal obstruction would bring on the other. With regard to Mr. W. J. May's remarks about glands in the neck, when one was unable to find a cause for enlarged glands in the neck, if there was no focus or sepsis one looked on them as tubercular. In the smaller glands it was difficult to prove they were tubercular because they were not removed. In some cases in which they had been removed they had been demonstrated to be tubercular. There was a difficulty in finding the tubercle bacillus actually in the tonsil. One might get a group of cases in which the glands in the angle of the jaw were tuberculous; it commenced in the tonsil and spread to the tonsillar gland and so on, and it had been proved at the children's hospitals that when those glands occurred, in ninety per cent., the infection arose through the tonsil. It had been actually found that milk from cows had been a source of infection. Mitchell examined a number of cases at the Children's Hospital in Edinburgh, and found that ninety per cent. of that particular type of case arose from milk. Chronic sepsis would account for a certain amount of enlargement of the glands in neck. Mr. Pitt's remarks had been very useful. With regard to high palate, Mr. J. G. Turner had examined a large number of asylum children and found that they had particularly well-developed jaws, and there were very few high palates, and he pooh-poohed the idea that high palates had anything to do with imbecility. He himself had been to that asylum and gone through the cases, and found very few children with high palates and he believed that idea must be given up. It was a thing that was copied from text-book to text-book. He thought mouth breathing had a good deal to do with temperature in connection with exercise. If the temperature of a man was taken just after he had played football it would be found to be 100° or more, and he believed the man took air through the mouth as a method of reducing the temperature, just as a dog did. He quite agreed with Mr. Rushton about the tongue. It seemed a most reasonable thing because the tongue was a very powerful muscle which had a very distinct moulding effect upon the jaws. He did not know any better argument than the position of the tongue in the mouth for the moulding of the jaws, but if one went into the question in connection with deformities one got into a tangle at once. Thumb sucking was a difficult problem and the President's explanation of why in some cases there was a deformity arising from the sucking of the thumb and in others not was interesting. He thought it depended on muscular action. He was discussing the question of deformity and thumb sucking, after seeing a number of cases Mr. Colyer showed, with another nose and throat surgeon who lived in South Africa. That surgeon had beautiful jaws and he put his teeth together and said that he sucked his thumb for

many years, and his family, numbering five, were all thumb suckers and had perfectly good jaws. With regard to the mouth screen, it did need a little perseverance. He had an aluminium mouth screen made for himself, but he found it rather hard and made him salivate and he eventually took it out of his mouth. He was going to try the rubber screen which was very much more comfortable and patients, especially the older ones, would wear it. It was difficult to train children at first, but if done gradually and with kindness it would be found that they would wear it. It could be put in the mouth for five or six minutes at a time, and that time increased until the patients fell asleep with the screen in position, and once that happened the difficulty was over. It was the best appliance he knew of to correct mouth breathing. Skull caps and chin straps and various other appliances, if they became loose, did not do their work properly; they were pulled off or worked off during the night. He did not know of any better method to cure the habit of mouth breathing than the mouth screen. With regard to breast feeding, he could not answer the question satisfactorily, except to say that he looked upon a breast-fed child as a perfectly healthy and normal child. An artificially fed child became a little delicate in health. Also one looked upon a healthy child as more easy to control. Apart from that he did not know whether there was much difference. With regard to patients of fourteen or fifteen years of age being amenable to treatment, he thought patients could be treated up to about twenty-one or twenty-five, until they were fully developed, but it was very much better to get them as early as possible. It was hopeless to try to expand the maxilla in a patient of twenty-one. Once a patient could be given a free nose and convinced that he could breathe through the nose quite freely, he was very persevering in wearing the mouth screen. That was probably the crux of the whole thing—to make them feel that they had a perfectly free and good nose which they could use.

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## Dental Ethics

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*A personal word from a Dentist in Western Canada to his colleagues, writing under the nom de plume, "Ich Dien."*

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WEBSTER defines Ethics as "The Science of Moral Duty." That Science is, or should be, deeply impressed on the mind of every graduate of every Dental College before they go forth into the world to seek an honorable livelihood as professional gentlemen. After a number of years in dental practice, I am forced to say that there should be among us, as a body of professional men, an unwritten, but nevertheless binding code of honor, one to another.

I am the only dentist in a small town of 700, in a rural commun-

ity. The last remembrance I have of our dear old Dean of my Alma Mater is his final words to us, in which he said "Making money and gaining a large clientele is *not* your special purpose in life. Never forget that you are professional gentlemen. Never allow yourselves to grow so anxious to build a large practice that you will stoop to casting a reflection on the reputation of your fellow practitioner. If you do use such methods, you are not professional gentlemen." I have never forgotten those words, and have tried to follow them.

There came to our town some time ago a "new" graduate looking for a location. I do not think the college from which he had graduated could have taught Ethics. He did not come to my office fraternally at first (where he would have received a cordial welcome), but spent the first day enquiring about me, and telling different of our people that "a lot of the work from here was going to the cities of H. . . . . and F. . . . .," or hinting that I was not up to the standard. Finally a *good* business man asked him why he did not come and see me. He then came, and his first remark was a stunner for *unethical rudeness*. He said "There is quite a lot of work from here getting past you, isn't there?" I asked him where he learned all that, and he said that dentists in H. . . . . and F. . . . . had told him.

Now here is the point. My clientele is entirely made up of farmers. Many live from eight to ten miles from town. The summer is short and very busy for them, and as a result many of them will not take the time to have the work done during that season, preferring to put it off until the less busy season, which is the winter; and then often the weather is very cold and the roads bad. A lot of these folks take a holiday in the city every winter, spending a week or two, and as it is so convenient for them to do so, they have their dental work done then and there, rather than make frequent visits to the small home town. In that way the man in the small town is at a disadvantage, but this need not be on account of lack of ability. Secondly, there is a great movement of people to-day (who may be suffering from ills of one kind or another) to the Medical Clinics in the larger cities. Almost the first order they receive from those clinics is to have bad teeth removed. They may have been so advised by the home town man, but it makes a greater impression on them when their health is impaired and the order is given from the clinic, and being in the city at the time, in almost every instance of this kind a city man gets the case. Again it is not because of the lack of ability of the man "back home."

Here is the crux of the whole situation. The dentists who told that graduate that a lot of the work was getting past me *knew those reasons why* (and those reasons are affecting every man in small towns), but they did not tell him those reasons. In other words, they preferred to leave the impression on his mind that "the fellow in that burg is no good." They forgot the meaning of the words "profession-

al ethics." They forgot how to be "a gentleman and a scholar." Worse still, the graduate so far forgot his professional training as to not scruple about trying to give the impression to the people who make up my clientele that they were not getting good dental service; in other words, to try and secure a place for himself by casting a reflection on the reputation of his fellow practitioner.

If that is the way to gain a big practice, then I will never gain a big practice. I hold that it is unethical and unprofessional to discuss other dentists and the work of other dentists with one's patients and with the public generally.

It is quite right, at times, to believe that a certain dental operation that had been performed by another practitioner should have been done differently, but it is *not right* to tell the patient so.

I would make a plea for a greater loyalty to each other among our professional ranks. It would be for our own good and raise the standard of our work. Let us try to uphold each other's good name *and help each other*, and if we cannot say a good thing of our brother dentist, then say nothing.

I would recommend every dentist to read "A Strong Man's Prayer," in October "Oral Hygiene."

"ICH DIEN.

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## Health Inspection of School Children

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**I**T would be impossible to overestimate the value of systematic health inspection of school pupils, in terms of good health, happiness, and efficiency. As evidencing the need for the inspection of the eyes of school children, the story is told of a country boy who came to the city from a little town, where he had been considered stupid because of the mistakes he frequently made.

Things went along fine for several weeks, while "Steve" made the usual blunders allowed the average new employee. But, as time passed, his superior became impatient and he was discharged.

Seated at the dinner table in the boarding-house, he was asked to "pass the rolls," but Steve passed a dish of baked potatoes instead. "What's the matter with your eyes, Steve?" asked one of the boarders. That started him thinking. Was it possible that all his blunders and inefficiency were caused by defective vision?

Steve consulted a specialist, who corrected the defect. He almost cried with joy when the things about him took on new shapes and clearer forms. He was given another chance and "made good."

## Classified Index of Periodical Dental Literature Covering the Period From 1839 to 1875

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**T**HIS is the most important volume of the series of Indexes as it covers the development of the dental profession from the time of the organization of our first dental college and the publication of our first dental journal up to the time when dentistry had become definitely established as a branch of the Healing Art. It gives the record of the work of that group of men who were the pioneers in the development of dentistry, and whose work and writings should be familiar to all who enter practice in the future.

Many articles published during the period covered by this Index laid the foundation for the development of our progress along almost every line of procedure, and it is doubtful if anyone is justified in preparing a paper today without reviewing some of the articles written during the period covered by this Index, and giving credit to the men of that day. In other words, this volume of the Index gives opportunity for the teacher and the writer to obtain a proper background for every subject upon which he might lecture or write.

Every dental periodical published in the English language during the thirty-seven years covered by the Index has been reviewed, and all of the articles have been classified. The more important of the journals are now available in dental libraries in all of the larger cities of the country, and in practically all dental schools. In addition there is being developed an abstract service which will make it possible for a dentist, even though located in the smallest town or the most remote region, to secure abstracts of articles on any subject for a nominal fee.

The Index is published by the Dental Index Bureau under the auspices of the American Institute of Dental Teachers, and is obtainable from the Secretary, Dr. Abram Hoffman, 381 Linwood Avenue, Buffalo, N. Y. It will be sent postage prepaid on receipt of \$6.00 to points within the United States and Canada, all other points prepaid \$6.50. The Index may also be ordered from Henry Kimpton, 263 High Holborn, London, England.

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**DEBTS OF LONG STANDING.**—It is evident that some people think that dentists can wait indefinitely for their money. Mr. C. W. Knudson, L.D.Q., of Cairns, Queensland, sends us a reply he received from a patient who had owed him thirteen guineas for eighteen months. The patient enclosed £5 in part payment and added: "I also have money out for the last twenty months, and larger amounts, and, in my opinion, your profession can stand this sort of thing better than our trade."—(*Dental Science Journal*.)

# THE COMPENDIUM

This Department is Edited by  
THOMAS COWLING, B.A., D.D.S., Toronto

A SYNOPSIS OF CURRENT LITERATURE RELATING  
TO THE SCIENCE AND PRACTICE OF DENTISTRY

## LOW TEMPERATURE ANAESTHESIA.

AT the Dental School of Paris there has recently been given a demonstration of local anesthesia produced with oxygen. The gas is applied to the area to be anesthetized by means of a special apparatus which is called a "Gazotherme." The gas is given out at regulated degrees of heat and at first soothes the inflamed tissues, and then, as the temperature is gradually lowered, all sensation disappears. When the operation is completed, the process is reversed, that is, the temperature is gradually raised, until blood temperature is reached.

The use of this anesthetic, while not particularly suited to exodontia, may prove of value in cases of cavity preparation or pulp treatments.

## NOVOCAIN AS A CAUSE OF DERMATITIS.

THE British Journal of Dental Science in several of its recent issues has called attention to a number of cases of dermatitis or eczema, resulting apparently from the use of novocain. This condition, which is variously described as "uticaria," "eczema," or "dermatitis," arises from the frequent handling of novocain. In some cases the surgeon who handles this drug will suffer from a rather widespread disorder. Frequently the skin of the hands becomes irritated and the fingers, especially the thumb and index finger, will swell up and crack. Sometimes the face, and especially the lips, become swollen. In one case the nails and skin of the hands came off leaving a pus-covered area.

In all of the cases cited, it is shown that a cure was effected by simply stopping the use of novocain, but the trouble recurred upon resumption of its use. The presence or absence of adrenalin made no difference so far as could be ascertained. In view of the large number of dentists using this anesthetic there are an insignificant proportion of victims suffering any ill effects. Obviously with novocain, as with

many other drugs, there are a few who have an idiosyncrasy for it. Possibly the victims in this case are suffering from other ailments which are accentuated through contact with novocain.

In view of the large number of drugs used by the dentist at the chair, in the laboratory and in x-ray work, it is surprising that more ailments are not in evidence. Iodoform, formaldehyde, oil of cajaput and many others of our common drugs have long been known as causative factors in various forms of dermatitis, added to which there are the "developing" and "fixing" solutions used in x-ray technique. "Metol," the developing agent commonly in use frequently causes dermatitis.

A complete report of these cases is given in April, 1922, edition of *The British Journal of Dental Science*.

#### A WORKING ARRANGEMENT.

EVERY calling, business or profession, has associated with it a code of ethics; indeed, we frequently hear about honor among thieves. However good or ill such a code may be, it must needs be respected or at least given an amount of attention compatible with expedience. Newsboys have their chosen or allotted street corners and woe-betide the intruder; the clerk behind the counter enquires if you are "being attended to" because he wishes to treat his fellow salesman fairly; the church worker calls at your home and invites you to his church provided you are not already a member of another. And so it is in all walks of life—a certain standard of honesty and right-dealing is observed and maintained.

This is as it should be; but now and again we hear a whisper about professional men not being as ethical as they might. A recent inquiry into things medical brought to light the possibility of a sort of "working arrangement" whereby commissions and refunds were secretly passed from hand to hand for "value received." However excusable such an arrangement may be it does not meet with general approval and its very clandestine nature stamps it as questionable.

The dental profession, if reports be true, is not above reproach in this regard. It is evident that what is in reality a "working arrangement" (or its equivalent) exists in certain quarters. And the evil is growing. Patients referred to a dental specialist for specific treatment do not always find their way back to the dentist who first treated them, but are frequently recommended elsewhere for the completion of the necessary work. It is especially provoking for the ethical practitioner to have his patient directed to an advertising dentist.

It used to be a trite saying of one of Canada's ablest jurists that if we would avoid even the appearance of evil we should not stoop too often to tie our shoestrings when passing through a berry-patch.

# JUVENILE JINGLES

*Contributed to ORAL HEALTH by Dora L. Cameron,  
Wenatchee, Wash.*

## Your Ventilating System

A ventilating system  
Is in your little nose,  
And it is through your nostrils  
The pure air slowly goes;  
So watch your nostrils always,  
That nothing blocks the way,  
Or stops the pure air passing  
Through them by night and day.

---

## Little Green Apple

Little Green Apple hung on a tree,  
"My," said a boy, "You look good to me!  
Guess you're sour, but that's all right,  
You'll go down in two big bites."

Poor little boy woke up in the night;  
Little Green Apple began to bite.  
"Why didn't you wait till I was ripe?  
You've got a pain, and it serves you right."

"Why did you eat it?" said Mother dear,  
"You shouldn't eat apples this time of the year."  
"Never again!" said the boy in bed,—  
"Not till they're ripe and rosy and red."

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## Plenty of Water

If little flowers would droop and die  
Had they not lots of water,  
What would become of you or I,  
Or any son and daughter,  
Had we not lots of water too?  
That's what I'd like to know.  
It's lots of water every day  
That makes us live and grow.

# MULTUM IN PARVO

This Department is Edited by

C. A. KENNEDY, D.D.S., 86 Bloor St. W., Toronto

HELPFUL PRACTICAL SUGGESTIONS FOR PUBLICATION, SENT IN BY MEMBERS OF THE PROFESSION, WILL BE APPRECIATED BY THIS DEPARTMENT

**"TIP" FOR "BITE-TAKING" AND "TRYING-IN."**—In taking a "bite" or "trying-in" teeth, always have the patient standing up in front of the operator, in a perfectly easy and natural position. A patient is much more likely to "bite" correctly than when the head is leaning back in the head rest of the chair. The centre of the face, the slope of the teeth, and the "height" of the "bite" can also be much more accurately determined.—(*British Dental Journal.*)

**CARE OF THE TEETH.**—Three plain meals a day, with brown bread and some fresh vegetables. No little meals in between. Avoid sloppy foods that give no exercise to the teeth. Avoid the sweet-eating habit. Finish a meal with some cleansing food, such as a piece of apple. Drink water and plenty of it. In brushing the teeth use only water, or salt and water.

**DIETETICS.**—With regard to the eruption of temporary teeth, especially in children who were badly under-nourished, the eruption was delayed. The shedding of the deciduous teeth was accelerated very much in the badly nourished children. The most marked thing was the premature loss of deciduous teeth. Many children of five or six years of age had only four temporary molars left in their mouths, and had nothing else but gum. In children of a little older age, the six-year-old molar had erupted and was drifting forward into the places of the lost teeth, and probably very marked malocclusions would result therefrom at a later date.—(*British Dental Journal.*)

**MIXING CEMENT.**—Always shake the cement liquid before using. The ingredients of which the liquid is composed vary slightly in specific gravity, and the bottle should be shaken each time before using, to secure uniform mixes.

**TO ROUGHEN OR ETCH AN INLAY.**—It is very important to cover carefully the part not to be treated with wax. Apply hydrochloric acid to the exposed part, and then treat with mercury. When the desired etching is sufficient, heat in flame and plunge in acid bath, wash and dry, and then you will find your cement will securely hold.—(*L. C. Kent, Sydney, in Dental Science Journal.*)



## “You Must Belong to the Old School”

ONE day a gentleman from a distant city called on me for an emergency service. He had been sent by an old college friend of his who had been my patient for thirty years. It was his first visit to Chicago, and he was to remain only a few days. I found it necessary to see him several times, to relieve an incipient abscess, and at the last visit he asked for his bill. I told him there was no bill. He looked at me in astonishment and asked, “Why?” I said, “There are several reasons. You are a stranger in our city, and you were having pain. You were sent to me by one of my old and favorite patients, who is a college mate of yours. But the chief reason is that I am doing this as a professional courtesy to your dentist at home.”

“But I have not mentioned his name, and you are therefore ignorant of who he is,” he said.

“That makes no difference. He is a member of my profession and is on that account alone entitled to any courtesy I may extend to him. I can assure you it is a pleasure for me to do this.”

He stood looking at me a moment, and then said slowly: “Doctor, I cannot imagine a thing like that happening among the professional men of my own city. I think *you must belong to the old school.*”

And the way that man said it conveyed to me a greater compliment than was indicated in the words he spoke. His remark and his manner set me thinking. Why did that unbiased business man think there was anything so very unusual in one professional man extending a courtesy to another? Why did he think that every professional transaction must be reduced to a question of financial consideration? He could only receive his impressions regarding such matters from his dealings with professional men. Why did he remark that he could not imagine a thing like that happening in his own city? The only inference is that the professional men of his city had given him an altogether different conception regarding the atti-


tude of one professional man toward another, or of professional men toward their patients.

Have we arrived at the point where every professional transaction must be reduced to the consideration of dollars and cents? Have we gone no farther than that? Have we lost that fine essence of professional courtesy and consideration which has so long been supposed to distinguish a professional calling from a commercial pursuit? Have our professional traditions left us nothing better than this? Has the prevalent commercialism of the age so invaded our professional ranks that we have entirely forgotten the glory of service for the sake of service? Must every patient who takes our chair be sized up as to the amount of money he can pay?

Pity the day when we shall give ourselves over solely to the worship of the god of Mammon. It was not along this line that the status of our calling was established, and it will not be along this line that it will be maintained.

This is no argument for the promiscuous administration of service without recompense. A laborer is worthy of his hire, and professional men must be paid. But I like to think that there still remains a sentiment among dentists which will impel one practitioner to extend the courtesies of his office to the patient of another in any small emergency, and do it in a gracious, generous way, without thought of financial gain. I am very sure that all three parties to the transaction will feel better. The man who performs the service unquestionably does, the patient who receives the treatment is impressed with the *esprit de corps* of professional men, and the man on whose behalf the courtesy is extended must feel a glow of satisfaction—that he is thought worthy of such consideration on the part of a professional confrere. Let us be charitable, and liberal, and generous, and whole-hearted with our fellow practitioners, and with the people we serve. In a large degree it will contribute to our professional happiness.

I would rather have a patient say that I belonged to the old school than to hand me a ten-dollar bill. The money would soon be gone, but the memory of what that man said, and his manner of saying it, still lingers with me as a sweet savor.



C. H. Johnson

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TO HARDEN PLASTER.—Plaster allowed to remain in saturated solution of boracic acid (using hot water) and three per cent. strong liquid ammonia, will make model like marble.—(*Dental Science Journal*.)

# ORAL HEALTH

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Vol. 13

TORONTO, NOVEMBER, 1923

No. 11

## EDITORIAL

### The Use of Latin in Prescription Writing

THE question as to whether or not Latin should be used in prescription writing has been debated, pro and con, for many years. A new interest has been added to the question through a bill having been proposed in a Western legislature, providing that "Any physician, or other person, who shall prescribe any poison, drug or medicine to another person, except by prescription written in the English language, shall be punished by imprisonment in the county jail for not more than one year or by a fine not exceeding five hundred dollars."

Legislation of this sort originates with laymen unfamiliar with the needs of professional men, out of sympathy with the learned professions, and ignorant of the humanitarian principles upon which the medical and dental professions are founded.

Latin, being a dead language, cannot be changed. It is exact and is not subject to idioms. In the language of the vernacular, English words are frequently used to indicate something entirely different from what would be implied by a literary interpretation. There are many illustrations of misunderstandings that might arise

from the use of English in prescription writing. *Pharmaceutical Advance* gives the following striking example of this fact:

R.

"Fldext. Cascar. Sagr.,—

is the abbreviation for Fluidextractum Cascaræ Sagradæ; as a matter of fact there is nothing Latin about this prescription except the endings, Cascara Sagrada being a Spanish name given to the bark of the buckthorn tree by a California physician who first introduced it to the medical profession. The Anglicized name is "Sacred Bark," while the older settlers called it "Chittim Bark." In one part of the state, the name buckthorn is given to a tree and in another to a shrub or bush. Hence, Fluidextract of buckthorn is liable to two interpretations. Then again, if Sacred Bark was called for, would not the laity immediately think of Jesuits' Bark, with the suggestion of Quinine?"

The psychological factor also enters into the question and in itself affords a very good reason for the continuance of the time-honored practice of using Latin in writing prescriptions. While the reaction of a few patients is acute irritation, this is just one more example of the *old* way being the *best* way.

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## The Ontario Dental Association

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**A**RRANGEMENTS for the next convention of the Ontario Dental Association are already nearing completion. The Board of Governors are bending every energy to make the 1924 meeting bigger and more useful to the profession than any of its predecessors.

A monthly magazine, carrying the appropriate name "The Booster," is to be issued by the Publicity Committee, giving the Dentists in Ontario full information, month by month, on all convention arrangements.

We bespeak for "The Booster" a most hearty reception. Read it and keep posted.

R. G. McL.

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**POST EXTRACTION TREATMENT.**—With regard to after-treatment, I usually swab the socket with tincture of aconite and iodine, and instruct the patient to use a saline mouth wash after meals. In cases where a good deal of damage has been done to the gum and process, or where the offending tooth has caused suppuration, I find that the following mouth wash, used through a syringe, is generally sufficient to bring about a healthy granulation: Ac. Carbol,  $\frac{1}{2}$  dram; Liq. Potassae,  $1\frac{1}{2}$  drams; Tr. Myrrhæ,  $2\frac{1}{2}$  drams; Glycerine,  $2\frac{1}{2}$  drams; Aq. Rosae, add 4 ounces. A teaspoonful in a wine-glass of hot water, used as directed.—K. C. A.



## A Christmas Message From Henry Van Dyke

I AM thinking of you to-day, because it is Christmas, and I wish you happiness. And to-morrow, because it will be the day after Christmas, I shall still wish you happiness, and so on, clear through the year. I may not be able to tell you about it every day, because I may be far away, or because both of us may be very busy ; or perhaps because I cannot even afford to pay the postage on so many letters, or find the time to write them. But that makes no difference. The thought and the wish will be here just the same. In my work and in the business of life, I mean to try not to be unfair to you or injure you in any way. In my pleasure, if we can be together, I would like to share the fun with you. Whatever joy or success comes to you will make me glad. Without pretense, and in plain words, good-will to you is what I mean, in the Spirit of Christmas.

—Henry Van Dyke.





WALTER F. CHAPPELLE, D.D.S.  
BUFFALO, N.Y.

# ORAL HEALTH

A JOURNAL THAT STANDS FOR THE "OUNCE OF  
PREVENTION," AS WELL AS THE "POUND OF CURE"

Vol. 13

TORONTO, DECEMBER, 1923

No. 12

## Suggestions for the Improvement of Full Denture Prosthesis\*

WALTER F. CHAPPELLE, D.D.S., BUFFALO.

SUCCESS in full denture prosthesis depends upon a conception of the term "denture service" in its broadest sense. Individual skill, mental and physical, are the real factors. Technics and articulators are secondary. For real success you can neglect none of the following: (1) An estimate of the patient's character and mental attitude, and the ability to change the latter if necessary. (2) A study of the physical conditions to be utilized or overcome. (3) An estimate of the cost of completing the dentures and service, based upon time and materials required. (4) The proper sales talk to impress the patient with the value of your services, without overselling them. (5) Careful planning and execution of the dentures. (You should have a mental picture of the esthetics desired and the type of dentures required before you start the work, and, in addition, should have a catalogue of all your former troubles and successes filed away mentally for use as it may apply to the case in hand. A little training will make you quickly grasp the temperament, character, mental attitude, muscle development and action, ridge conditions and relationship, and mandibular movements of your patients.) (6) A careful checkup of the articulation, stability, and peripheral seal, at time of placing in the mouth, especially for the patients living a distance from our offices. (7) Brief, but comprehensive, instructions. (8) Another appointment soon enough, so that you can give relief before discomfort becomes annoying or bad habits are learned. (9) Other appointments as needed, to keep proper check on the

\*Read before the Academy of Dentistry, Toronto, Wednesday, 17th October, 1923.

patient and dentures, so as to keep her co-operation and confidence. (10) A definite method of locating errors and the correction of minor errors easily. (11) A definite business policy and method of payment of fees. All the above are essential to success. In proportion as you neglect any of the above you are courting failure.

How many of us do all this? Is it any wonder we do not get results? Some of us seek to make psychology a cloak for poor work, others to make articulators accomplish everything, others fail in giving the service and co-operation after the completion of the work and some try to make impressions and central occlusion accomplish wonders.

Does this make it clear to you why I say articulation technic and articulators are secondary to individual skill, mental and physical. Mental skill is by far the greatest factor. Does it not seem inconsistent to buy an articulator and study technics as the first step to success? They are a wonderful aid to success, and I do not regret all the courses I have taken and the time I have spent in study. I wish I could have time for very many more, but most of us have not the time and money, or the perseverance, to do it, and hence I am convinced the general practitioner should start with the different phases of the complete service in the order named above and study technics and articulators in their proper place. The instrument you are using may be ideal for you, if you know how to get the best out of it.

To present the foregoing in a different light, dentures are made with reasonable success on all articulators, while less skilled operators fail with the same instruments. It is individual skill that makes success possible. Careful attention to every detail of complete denture service, plus intelligent careful choice of and use of an articulator, gives ideal results. A degree of success does not mean that the ultimate has been reached. An instrument suitable for one operator may be unsuited for another. Just as a cheap universal camera is best suited for an unskilled photographer, while a complex, expensive camera will accomplish wonderful results for an expert, so the dentist must choose an articulator wisely. Don't buy an expensive articulator unless you will learn to use it properly. I have seen adaptable articulators used without a facebow, and with carelessly obtained bites, and later followed with badly worn flasks and careless vulcanization and damaging polishing.

As a suggestion for the man who has the time and interest, a comparative study of articulators and technics will be very instructive and interesting. For instance, the placing of a V-shaped tilted adjustable incisor guide on an adjustable articulator will give steeper cusps than usually obtained with a Hall articulator, and the cusps will co-ordinate with the condyle paths if you desire co-ordinated

cusps. In other words, cusps can be made as steep as desired and still co-ordinate with given condyle paths. Steep cusps do not have to be entirely arbitrary or have to be made on an arbitrary articulator, but steep cusps do require readjustment of mandibular movements to the narrower limits laterally of the steep cusps, and this is sometimes desirable. For instance, patients having a wide triturating mandibular motion, with severe biting stress and poor ridges, which would result in instability laterally, can be more readily forced to discontinue and assume more of a chop bite by a radical change to extremely high cusps. If they will accommodate themselves to the high cusps, success results; if they will not or cannot do so, the high cusps are a failure. Personally, I cannot see any reason for an entirely arbitrary high cusp, except as an expedient. The use of grinding material in the mouth at times by the advocates of arbitrary high cusps, even to a limited extent, is proof to my mind that co-ordination of all high cusps would accomplish better results.

The practice of full denture prosthesis is one of the most difficult branches of dentistry to follow. Varying ability of the dentist, varying adaptability of the patient mentally and physically, and improper education of the public as to what to expect and the value of denture service, are responsible. It is one of the purposes of this paper to suggest remedies for this condition which each may develop to suit his own practice. There is no doubt but what we are responsible, and it is up to us to change things. No business man with a product as essential as ours would let the buyers dictate the terms under which they would buy the product. In most other lines of human endeavor, where definite standardization is impossible, we pay for the best efforts of the operator, regardless of the degree of success obtained. Physicians, lawyers, and even the man who repairs your auto, are paid without any guarantee that their services are up to the peculiar degree of success the buyer of their services may correctly or erroneously expect. The principle that success is often a relative term, depending upon the skill of the operator and the adaptability of the patient, does not enter into the denture bargain. We have failed, in that we have been content to sell dentures, instead of our services and skill.

We do not try to educate our patients. If grandma or Mrs. Jones is held up by a patient as a shining example of what has been accomplished by someone else, especially after ten years' use, you are pretty safe in getting that patient in and putting her to the test with cotton rolls or pine sticks. You will usually find them chewing in one spot only or on two sides at once, or biting very lightly, as shown by relative dents in pine sticks or playing some other of the many tricks possible. Very often you will find no stability at all. If results are ideal, you will usually find conditions ideal.

Since a denture is not a finished product when first placed in the mouth, and each case is a separate problem, requiring individual treatment, and each subject to the adaptability of the patient, a system of prognosis and analysis, using Dr. Gillis' chart, is very valuable, as a practical means to locating the cause of unfavorable results. For the location of errors and their correction immediately and in a simple way, if not too severe, I suggest a correction technic which has been a great help to me. I feel that this correction chart and technic not only saves time and annoyance, but that its use makes Dr. Gillis' chart more reliable, and that they are the most valuable means at your disposal of checking up on your work and turning your troubles into assets. Most of us are like the tailor who can cut new suits, but when some suits fail to fit he cannot tell the reason why. Our failures make us lose confidence when, if we could locate their causes, and correct them readily, they would make us gain in confidence. We all have our faults, and if, after six months of effort, we can look back over our charts and see that we have overcome certain errors and improved our technic by the adoption of changes in procedure, then we can feel we are on the right road, but if we cannot see that improvement, we must analyze the progno-analysis chart and see where the trouble lies. If in the first column, we either do not judge our patient's mental condition, or we do not use the psychology to improve it, or we may improve it too much and not be able to live up to the picture we paint. If in the second column, we do not understand diagnosis of physical conditions and how to utilize or overcome what we find, and columns one and two under function will suffer. If in the first column, under structure, we need to make a study of facial harmony and tooth form, shade, etc. And so, passing on over the other columns, you will be surprised to see how often fees and failure to get cash is the cause of trouble. Failure to get cash when dentures are placed in the mouth, and, better still, one-half when dentures are started, shows lack of confidence, and, if you do not have confidence, you are starting under a big handicap. Since so much in denture service depends upon conditions in the patient's mouth and the co-operation of the patient, it is essential that active co-operation is obtained from the patient, which is only possible in many instances when a payment has been obtained. Illness or business may prevent other patients from giving you the time to make the necessary minor adjustments and so hold up payment. Many patients who have no investment will not take the same interest.

There will always be men who will take advantage of the fact that they have the money and will not deliver the goods, just as some men will make psychology a cloak for poor work. Such men we have always had with us, but that need not prevent us from

using psychology honestly as a valuable aid to explain the superiority of his services and in helping the patient to give that valuable co-operation so desirable, and so with getting cash it will work to the advantage of both the dentist and patient. The conscientious operator will always enjoy doing more for the patient who pays promptly and shows her confidence, than he will for the patient who withholds payment to try to force the dentist to measure up to some standard she has decided upon. As for the patient, if she has to give up her money beforehand, she will be more sure to inquire if the prosthodontist has the ability to deliver the type of work she wants. Too many patients, knowing their expectations are high, still choose the cheaper priced dentures, because if they pay nothing beforehand, they have nothing to lose and everything to gain. We can all spend our time to better advantage than to work under such a disadvantage.

What I have suggested to you may seem too lengthy and detailed to appeal to the general practitioner. The keeping of charts and the many subdivisions of the complete denture service offered for your consideration may seem like a hopeless task, but I assure you it is the only logical way to go about improvement. This plan, or some similar one, which it may suggest to you, will help you to be systematic, consistent, and practical in your efforts, to be well balanced, to give to each phase of complete denture service its true value. Some of you may not need to keep charts, but can chart results mentally. Others may not have the time to keep charts, but study this chart of Dr. Gillis' whether you use it or not. It will help you to get the idea of dividing up the various divisions of denture service for study. It would pay all of us to keep a limited number of charts for difficult cases.

Another suggestion for bettering your work is to keep one or more almost hopeless cases in hand to send for during slack times for study and improvement. An intelligent, persistent fault-finder is a wonderful help in the study of better methods.

Another suggestion is to send for patients after a lapse of weeks or months and check up for stability, esthetics and efficiency. You will often be decidedly disappointed at what you thought was quite satisfactory at the time of making.

This is a different attitude from the stand I have taken before, as I have been radically enthusiastic over each technic and articulator I have studied. I have found great improvement from each course I have taken. They all had merit and I wish I could have time for very many more. The study of different methods makes one more tolerant and broad-minded, and it is possible to choose and use an articulator more intelligently, but if one starts with a study of articulation and the purchase of an articulator, and stops there, he will place undue stress upon that phase of denture service and

expect too much of it. They will not cure all your troubles, nor will they do your thinking for you. You are apt to be too enthusiastic at first and too reactionary later to make any further effort. Be consistent and use good judgment, and you will have a steady improvement that will be lasting and make you want to improve indefinitely.

If, however, after some effort, you find that you are not able, or do not care, to practise full denture service, do not try, or, if you are only partially successful, learn to know your limitations, and refer such work to someone who can handle it better. Don't refer such patients after you have wasted your time and theirs, in useless effort, but do so as soon as you diagnose the case as undesirable. You save your reputation and many valuable hours you could spend to better advantage developing some other branch of your practice or in needed recreation. There is no disgrace in referring patients. You can explain to them that their case is abnormal and make them feel you are doing them a favor. Consistent practice of denture service, better business methods, and intelligently improved technic, together with education of the public, will be a boon to both patient and dentist.

#### CORRECTION TECHNIC.

This correction technic consists of a chart and the use of black wax or red compound sticks, carbon paper and carborundum stones, and an alcohol mouth blow lamp. The probable cause of trouble is located by questioning the patient, using the chart as a guide. For instance for instability, asking the patient if instability occurs when not using the dentures for masticating, or when using the anteriors only, etc., will locate the group in which the cause of trouble may be looked for. The items in each group are arranged in the order in which they are most likely to cause trouble. If the trouble is due to some serious structural defect, such as improper arch form or bite plane, or other serious fault, it will be necessary to do some of the work over again, but if the cause is suspected to be pressure on the hard palate, the remedy is to spread a thin layer of black carding wax over the suspected area, place in moderately warm water, and return to the mouth and test. If the wax is displaced, it shows too close contact at that point. Red compound can also be used if preferred, but it takes more heat. Black wax shows trouble very readily if heated in warm water until just short of melting and has the added advantage of being easily cleaned off by warming the denture and wiping off with a piece of cheese cloth. The underside of the denture is oiled or soaped and some quick setting plaster is run over the surface. This is removed and the surface is scraped under the point where the riding took place, as shown by the black wax. The plaster is replaced and the area to be depressed is warmed with the blow lamp carefully

and pressed down to the extent the plaster was scraped. Chill and try out denture again, to see if correction is sufficient. Suspected excessive pressure anywhere in the denture may be similarly located and corrected, and discrepancies in contact as well. After closing leaks or relieving pressure, wax may again be used to check up on the correction and surprising accuracy in adaption may be obtained. Excess wax left on the surface means lack of contact and entire

INTERFERENCE	Swallowing	<ul style="list-style-type: none"><li>1. Upper-overextension posteriorly causes congestion of the soft palate</li><li>2. Lower-neck and tongue muscles lame from lingual flange extension.</li><li>3. Cramped tongue space.</li></ul>
	Speech	<ul style="list-style-type: none"><li>1. Cramped arch design.</li><li>2. Thickness or clumsiness.</li><li>3. First bicuspid too full lingually.</li><li>4. Spaces between teeth or arches too hard to close off with the tongue.</li><li>5. Loss of natural posteriors some time previous to the anteriors.</li><li>6. Excessive opening of the bite.</li><li>7. Excessively short bite.</li></ul>
	Laughing	<ul style="list-style-type: none"><li>1. Overextension interfering with muscle action.</li><li>2. Poor suction.</li></ul>
	Yawning	<ul style="list-style-type: none"><li>1. Riding on the muscles especially in the buccal region.</li><li>2. Too long posteriorly.</li></ul>
	Tongue	<ul style="list-style-type: none"><li>1. Too long flanges on the lower lingually.</li><li>2. Bulky.</li><li>3. Poor arch form as to length or width.</li><li>4. Excessive opening of bite.</li><li>5. Improper positioning of bite plane.</li><li>6. Loss of natural posteriors some time previous to anteriors.</li></ul>
	Biting cheeks	<ul style="list-style-type: none"><li>1. Posteriors edge to edge buccally or nearly so.</li><li>2. Posteriors carry too far back.</li><li>3. Cheeks flabby or too fat.</li><li>4. Too short bite.</li><li>5. Accidental biting of cheek and swelling, the swollen tissue being in the way.</li></ul>
	Biting tongue	<ul style="list-style-type: none"><li>1. No posteriors for some time previous to losing the anteriors.</li><li>2. Sharp cusp edges.</li><li>3. Instability.</li><li>4. Improper positioning of the bite plane.</li><li>5. Too long or too short a bite.</li></ul>
INSTABILITY.	When not in occlusion	<ul style="list-style-type: none"><li>1. Over extension of borders.</li><li>2. Leaks<ul style="list-style-type: none"><li>(a) On hard palate.</li><li>(b) On posterior spines.</li><li>(c) On circulation.</li></ul></li><li>3. Pressure</li><li>4. Anterior teeth and gums too full.</li><li>5. Failure to fill space between tuberosity and cheek.</li></ul>
	When using anteriors	<ul style="list-style-type: none"><li>Hard foods<ul style="list-style-type: none"><li>Uppers-riding on the hard plate.</li></ul></li><li>Uppers and lowers<ul style="list-style-type: none"><li>1. Leaks at posterior border.</li><li>2. Poor balanced bite.</li><li>3. Lack of contact with anterior ridge.</li><li>4. Soft ridges.</li><li>5. Excessive building forward of the anterior teeth giving too great leverage.</li></ul></li><li>Soft or tacky foods—poor peripheral seal at the anterior border. Leak at the frenum.</li></ul>
	When using posteriors	<ul style="list-style-type: none"><li>Hard foods<ul style="list-style-type: none"><li>Uppers-riding on the hard palate.</li></ul></li><li>Uppers and lowers<ul style="list-style-type: none"><li>1. Poor balanced bite.</li><li>2. Poor cusp co-ordination.</li><li>3. Lack of contact with ridge on the same side.</li><li>4. Soft ridge.</li><li>5. Poor peripheral seal on opposite side.</li><li>6. Teeth too far outside of ridge.</li></ul></li><li>Soft foods-leak on the same side,</li></ul>

DISCOMFORT	Soreness	{	In the throat or neck—due to overextension or cramped tongue.	{	1. Muscle impingement.
					2. Instability may cause rubbing, usually opposite excessive biting stress, but more often inside the denture over a prominence.
			Of the ridge tissues	{	3. Sharp edge on denture.
					4. Excessive pressure.
	{	At the border of the denture	1. Pressure from imperfections or sharp process.		
			2. Instability causing rubbing on tuberosity or prominent process		
	{	Inside of the denture	3. If denture and ridges are smooth look for too great bite pressure if soreness is on top of the ridge, and if on side of ridge look for too steep cusps or overbite causing lateral pressure, also riding on the hard palate, may be a cause.		
	In the case of partials, poor adjustment of the clasps causes soreness due to displacing saddles.				
	Nerve irritation	{	Upper	{	1. Pressure on palatine foramen and plexis. Both may cause reflex irritation in the nose.
2. Pressure on papilla or large rugae.					
3. Pressure on posterior buccal region. May cause reflex ringing in the ears or pain in the temple.					
4. Too deep relief over hard palate.					
{	Lower—	Pressure over mental foramen.			
Gagging	{	Often due to overextension posteriorly. Check up by placing finger tip or an instrument over suspected area and produce gagging before trimming. Tissue directly posterior to the centre of the hard palate is less sensitive than tissue on either side. It is well to curve the posterior border of the denture when necessary to go beyond the hard palate and escape sensitive tissue.			
		More often it is due to poor contact, causing a tickling sensation at posterior border, rubber too thick or posterior teeth too long and touching the side of the tongue where it is often sensitive or to cramping the tongue which is held too far back in the throat and stimulates gagging in swallowing.			

obliteration of wax showing pressure; an adjustment that will leave an extremely thin, even film being ideal.

Uneven biting stress or cusp interference are each detected by the use of carbon paper. Uneven biting stress is shown by black areas where excessive stress occurs, and it is essential that hard pink wax sheets be placed between the teeth of such areas, as a certain amount of instability of the dentures may occur under a great discrepancy, the extent of which would not show up except through the wax re-seating the dentures.

Poor cusp articulation will be disclosed by carbon markings that are uneven in blackness at different parts of the mark. The grinding is to be done in the same proportion, the deeper the mark the greater the grinding needed. Think before you grind, and learn to read carbon markings accurately. Much damage can be done by improper grinding.

It is surprising what can be done by such simple methods. For purposes of testing temporarily, it is even possible to move the teeth and rubber with them, to relieve striking the anteriors, without loosening the teeth or opening the rubber. This method of relieving the hard palate and closing leaks is a great help in carrying patients with temporary dentures along to save rebasing so often. The mastery of the possibilities of this correction technic will overcome the lack of confidence apt to result from failures, the cause of which we are not certain, and it is also a wonderful time saver.

# The Need of a Closer Relation Between Medical and Dental Studies\*

By J. STANLEY BAGNALL, D.D.S., HALIFAX, N.S.

DENTISTRY had a very intimate association with general medicine through the centuries which stretched from the dawn of written history up to about the beginning of the 18th century, when Fachard's work marked the first clear step in the separation of the dentist from the physician and the surgeon. This separation did not become distinct until about the year 1840, when a number of dentists in Baltimore approached the authorities of the Baltimore Medical College with the proposal that instruction in dental subjects be given. This was done, with the result that the first dental college was opened in Baltimore in 1840. The gap gradually widened, each profession working out its own problems, without reference to the other. Dentistry entered into the most intensely mechanical phase through which it has ever passed. Its problems were worked out without any reference to their possible systemic effects. Restorations of single teeth or of missing teeth were considered as mechanical rather than medical problems. Then gradually dentists began to realize that their problems were not bounded by the confines of the oral cavity, and courses in physiology, biology, systemic histology, etc., were added to the course. The influence of disease in other parts of the body on the teeth was beginning to be noted, and occasionally articles appeared pointing out the effects of dental disease on distant parts of the body. When Hunter in 1911 delivered his famous address at McGill, on the relation of dental disease to pernicious anemia, it fell on prepared soil, and both professions awoke almost overnight to a realization of their close affiliation. It seems inconceivable to any thinking man in either profession to-day that the first part of the alimentary tract should have been so long isolated from the rest of the body. While there have been unfortunate extremes, and "almost every disease from premature baldness to ingrowing toe nails" has been blamed on the teeth, with the resulting sacrifice of many valuable teeth by both professions, there are evidences to-day that both professions are settling down to a sane study of the problems which affect both.

What are some of the problems?

*Caries of the Teeth*—A disease affecting 98 to 99% of civilized peoples. The first scientific studies on the cause of caries were made by Miller about three decades ago. He thought that caries was the result of lactic acid formation by bacterial action; and while the local action of bacteria is still believed in, it is felt to-day that there

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is in association with this some systemic cause which makes the teeth a more favorable field for bacterial action. Whether this is due to some derangement of the glands of internal secretion, or is due to faulty diet, or to some other cause not yet advanced, remains a problem. If the carious process is allowed to progress unchecked, teeth become sore, mastication is interfered with, the pulp is infected and eventually dies, when the poisonous end-products which are formed may be carried to all parts of the body and set up some local infection or so act on the body as a whole as to bring about a lowered resistance.

*Pyorrhea*.—More theories have been advanced as to the cause of pyorrhea than in the case of any other dental disease, and still the problem remains unsolved. But we can feel reasonably secure in saying that in many cases, at least, there is some local irritation which acts in conjunction with a systemic condition. Here again are formed those end-products of tissue decomposition, which may be carried to all parts of the body, with consequent ill effects.

*Gingivitis*.—An inflammation of the gum tissue, which may be the result of a local irritation or of some systemic cause such as mercurial and lead poisoning, or the result of some disease as nephritis, diabetes, scurvy, etc. This condition if unchecked may end in pyorrhea alveolaris.

*Malformed Arches*.—Every dentist and medical practitioner is familiar with the so-called "adenoid face," with the contracted dental arches, protruding upper anterior teeth, open mouth, mouth breathing, adenoids and enlarged tonsils. We know that we have here a true vicious circle which tends to become worse if untreated, and which has very definite ill results on the system, but where is the cause? Sir Arthur Keith and Mr. G. A. Campion, in their very thoughtful paper "A Contribution to the Mechanism of Growth in the Human Face", state that there is a tendency for the face of the modern Briton to become narrower; that the narrow, deeply arched palate is not a single defect in an otherwise well-developed face, but is part of the failure in the general growth of the face; that this diminished or defective spread of the palate in the modern skull is due, in the main, to a failure of growth along the mid-line suture of the palate; that the narrow, deep, palatal arch, the irregular eruption of the teeth, are not due to a simple mechanical cause such as the pressure of enlarged tonsils, or of adenoid vegetations in the respiratory tidal way, but that we are dealing with an arrest or disturbance of the elaborate machinery which underlies facial growth. They regard enlargement of the tonsils, growth of adenoid vegetations in the naso-pharynx, and disordered or irregular growth of the jaws and face as manifestations of a single pathological state. What the exact nature of this underlying pathological condition is, they are not in a

position to state. The irregularities of the jaw and the development of adenoids may result from a nutritional disturbance. The explanation may be that a diet deficient in certain vitamine constituents will affect the hormone growth systems of the body.

*Irregular Teeth.*—May be the result of the condition outlined above, or there may be a deficient development of the jaws as the result of some systemic cause, such as a faulty diet, for the mother before the birth of the child or for the child itself after birth; or again it may be the result of faulty habits as the use of comforters, or the use of poorly designed nipples in nursing bottles, or it may be the result of some hormone deficiency. The end result, if untreated, is a lessened efficiency of the teeth as masticatory organs and an increased tendency to caries.

*Impacted Teeth.*—Are almost always the result of deficient development of the jaws, possibly from some of the causes outlined above. If untreated they may result in neuralgias, neuritis or even in some types of insanity.

*Loss of Facial Dimension.*—A decrease in the amount of separation of the mandible from the maxilla as the result of tooth extraction, wear on natural teeth, etc., shortens the distance between the origin and insertion of the muscle of mastication, causes decreased muscle pull, with a consequent throwing out of balance of the muscle activity. This loss of muscle balance is the prime factor in producing a backward tip of the condyle, which encroaches on the external auditory meatus and may cause a resultant defect in hearing proportionate to the amount of the encroachment. This shortening of the distance between the maxilla and the mandible gives lessened area to the tongue, which is thus forced back into a position which impairs its own function and crowds on adjacent tissues, lessening their function. This impedes the act of swallowing, reduces the area of the air passages, and causes lack of drainage in all parts affected by the tongue, especially the Eustachian tubes.

These, in brief, are some of the problems which affect both dentistry and general medicine, and on which much research is still necessary if we are to advance towards our ideal of preventive medicine. But while we advance by slow and painful steps towards our ideal of the prevention of disease, we must never lose sight of the fact that the sick and maimed are ever with us. Dentistry and Medicine have for far too long a period travelled separate roads in the treatment of diseased conditions. These roads should never have separated, but now that they have converged, what steps must be taken by both dentist and physician to treat those diseased conditions which affect both professions? If the estimate made by Dr. Charles Mayo is correct—"that great scourges had been removed from the earth and that the present

generation would not die from them but from some simple infection—90 out of 100 die from simple infection, the result of some focal infection, which focus itself would give them no trouble; 90% of the lesions of these focal infections are above the collar,”—then it would seem that dentistry and medicine have much in common.

We have heard much during the past decade of dental foci of infection, and a formidable array of diseases have been laid at its door. Undoubtedly the focal infection pendulum has swung too far, yet the fact remains that it plays no mean part in systemic disease; and team work is required between dentists and physicians. It seems to us that the logical starting point for this is in the college. Since the mouth is so intimately bound up with the rest of the body, the dental student requires a sound grounding in those subjects which we think of as the fundamental subjects of all medical study; biology, anatomy, histology, physiology, pathology, bacteriology and the general principles of medicine and surgery. The dental student must be taught the relationship between dental work and dental disease with the system as a whole, and the medical student requires the same training. The dental colleges of the continent have already started instruction along these lines, but there still remains a serious break in this scheme. How many physicians are able to make an intelligent estimate of the presence of dental disease and refer the patient to his dentist for the necessary treatment? There are too many physicians who make their diagnosis on the basis of the presence or absence of gold crowns and bridgework. We do not advocate a course in dentistry for medical practitioners, in this age of specialization, but we do feel that every medical college should include a dentist on their faculty who would give a short course of lectures on dental diseases and their relation to the system as a whole.

#### DISCUSSION.

Dr. Cassidy (Professor of Physiology, Dalhousie), spoke of the difficulty of giving a course in Physiology which would be entirely suitable to dental students. He felt that the student should receive rather more than a course which only included such subjects as the circulation, digestion, respiration, etc., but that if the dentist of the future was to be given a sound grounding, which would enable him to pursue research work, if he so desired, he should receive a rather more general course in Physiology. His course should include a series of lectures on the endocrines, etc. He repeated a remark made by President McKenzie, of Dalhousie, that he felt that dental education of the future should follow along lines very close to those followed by the student in general medicine, but where the latter commenced to study clinical medicine and surgery, the dentist should branch off and study clinical dentistry.

Dr. A. G. Nicholls (Professor of Pathology and Bacteriology), thought that the requirements of both the medical and dental student, so far as general pathology and bacteriology, were very similar; but where the medical student extended his studies into the question of morbid pathology, the dental student should receive special instruction not only in the pathology of dental tissues, but also in the conditions which affected the teeth.

Dr. C. Holland (Anatomy Department), felt that the medical student should receive some instruction in extraction and its after treatment, since so many medical practitioners are going to smaller places where no dentists are available.

Dr. W. H. Hattie (Assistant Dean, Medical Faculty), felt that closer co-operation was necessary between the two professions. In those cases where indiscriminate tooth extraction is ordered, and no benefit received, both professions are injured. He felt that the medical student should receive instruction from the dental standpoint by a dentist, in those subjects which closely related to each profession.

Dr. J. S. Bagnall (Dental Faculty), in closing, thanked those who entered into the discussion. He felt that the problem of instruction in extraction was rather too big a one to tackle, that what was required was more general instruction.

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## Cast Gold and Aluminum Bases. Using the Moore Plate Flask

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By GUY T. KANTNER, D.D.S., TOLEDO, OHIO.

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THIS is written in the hope that those interested may find, in the methods described, some hints and suggestions tending to shorten the casting operation, and add to the definiteness and certainty of results.

No originality in the methods recommended is claimed; and I wish to avail myself of this opportunity to express my gratitude to the many able workers and writers who have contributed to the making of better dentures than was possible under older methods.

In describing the different steps in detail, which is essential in a paper of this character in order that the reader may duplicate the process, one must necessarily mention many things that are well known to many and often emphasized in writing; therefore, the reader will kindly bear with the writer in recalling such points as may be entirely familiar to him.

The impression, if any part of it is of plaster, should be painted with a coat of thin shellac, followed, when dry, with a coat of sandarac varnish. When the varnish becomes dry, immerse the impression

in water in order to fill the pores, which will prevent the absorption of water from the material used for the model or cast. It is well to blow off any surplus water that may remain on the impression before endeavoring to pour the cast, since any free water on the impression will thin out the material forming the cast, and cause a weak or soft spot. A modelling-compound impression may be used without varnish, and it is unnecessary to place such an impression in water.

The model (or cast) should be made from some one of the artificial stones. Those that are finely ground will yield a cast with a dense and smooth surface, and one that is not easily affected by water, handling, or the adapting of the wax. Surround the impression with boxing-wax to a height of at least one inch above the edge, to obtain sufficient thickness for swaging.

The mix of the stone is quite important, for the strength of the cast is greatly affected by the amount of water incorporated with the powder. In models for this work the maximum strength is required, since it is necessary to swage the cast plate to counteract the shrinkage of the metal during the process of casting.

The first part of the mix is carried forward about as in mixing plaster, spatulating the mass thoroughly until the water and powder are completely incorporated. Continue adding powder and spatulating until the mass becomes too dry to be handled with the spatula, when it should be taken from the bowl and kneaded in the hands. More powder may then be added by placing the mass in the powder and again kneading, repeating until the correct consistency is attained. This is a very smooth, stiff mix, not pliable, and will break apart readily; yet when placed in the impression and jarred down by tapping on the bottom of an inverted plaster bowl it becomes very mobile, and settles to place without difficulty. (*See foot note.*) The jarring should not be continued long, since the surface next the impression soon becomes smooth, and the bubbles that rise into the mass of the cast are so few that the strength of the material is not greatly decreased by their presence.

The resultant cast may be removed from the impression at the end of about two hours, and any necessary carving should be done at that time. The cast should then be allowed to stand exposed to the air for one hour, when it should be placed in warm water, about 98° F. The laboratory wash-bowl is very convenient for this purpose, for, by allowing a small stream of hot water to flow over the cast, the temperature is held constant. The placing of the cast in warm water allows it to take up sufficient moisture to prevent the wax sticking to it. It also raises the temperature of the cast, which facilitates the adaptation of the wax. Water at the temperature recommended, when imparted to the cast, does not soften the wax, except in the cooler weather; but it does improve its workability. I

have been using the R. & R. special base-plate wax, but there may be others that will work at about the same temperature.

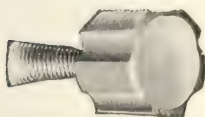
Crumple up several sheets of tissue-paper and form them into a roll about one inch in diameter and two inches long. Two of these rolls should be made and placed in water. Now, the wax, 30-gauge, is dipped in the warm water and placed on the cast, we will say, for an upper denture, and very lightly carried down into the vault at the posterior extremity of the cast. This results in but one bend of the wax, the posterior part lightly touching the posterior vault from heel to heel, the anterior part of the bend touching at the lingual curve of the ridge from the heels to the anterior median line.

Place one of these tissue rolls in this bend of the wax and while holding the wax in place with one thumb, press down on the paper into the posterior quarter-inch of the vault with the other. Retain this with the thumb to hold in place and, with the other thumb and finger, press the paper roll together away from the sides of the vault and force it into the vault; then flatten out with the thumb.

The tissue holds the warm water, which aids the flowing of the wax. The water also softens the paper, and makes it an ideal swaging material for the wax. The use of tissue-paper in this manner will adapt the wax to the vault, and over the remainder without undue thinning or tearing. Hold this roll in the vault with the thumb while continuing the adaptation. This will insure that there shall be no movement or "creeping" in this section.

The wax is now cut in the part that extends beyond the ridge, at the median line, forward to the edge. This allows the two sides to be adapted separately. If there is a depression on the ridge between the cuspid and tuberosity, it is best to grasp the wax gently between the thumb and finger, and lay it down over the ridge by rolling the thumb. This prevents a fold. The tissue is again used, and the adaptation completed on the one side.

The wax projecting beyond the median line and frenum should be cut away, and the wet paper rubbed gently over the cut edges. The edge is thereby burnished to a knife-edge, which will join with the other side as it is brought to place without a noticeable joint. This burnishing effect of the tissue-paper roll is well worthy of attention, since, by its use in adapting, the wax is drawn thin. The paper is best handled by pressing at right angles to the wax, or in a rolling manner. When the wax has been completely adapted it can be polished very nicely by taking advantage of the burnishing effect of



Note.—A very convenient and entirely satisfactory "jogger" may be made easily from the hub of a brush wheel and screwed into the mandrel of a lathe. When the impression has been filled, place it on a sheet of tin or anything of that nature, and hold the tin gently against the surface of the rotating "jogger."

the tissue-paper, as mentioned. This is done by lightly stroking or rubbing the wax with a roll of damp tissue-paper.

The wax pattern now becomes a matter of individuality, necessity, and the requirements of each particular case; therefore I shall not attempt to say how it should be completed. The undercuts for the vulcanite may be made deep or shallow and vulcanite attachments made to suit the ideas of the operator. I generally use about a one-sixteenth inch strip of twenty-gauge wax for the lingual undercut, pressing it lightly onto the pattern, and then sealing it with the hot spatula. By allowing this to cool and then going over it with a spatula warmed just enough to burnish, the joint is improved, and the undercut shaped as may be desired. (*Fig. 1*).

There are many ways of making attachment pieces for the Vulcanite. I find a piece of wax in zig-zag form, called a "Vulcanite Attachment," very good for this purpose. It may be applied on the points, making loops, or laid down and then burnished down into over-hanging edges, forming undercuts, as the cast may require. (*Fig. 2*). All of this work is facilitated by using one of the low-power electric-light bulbs. The heat from such a source, thrown on to the pattern, keeps the wax in a workable condition. After all attachments are placed, the excess wax is trimmed away.

The pattern is now ready for attaching the sprue and investing. It is well to remove the pattern from the cast at this time, in an experimental way, since it gives us the assurance of its coming away later when we wish it. This is best accomplished by placing cast with wax pattern up in the bowl; stop the flow of warm water and allow to remain for few minutes. Its removal may be facilitated by using a water syringe and playing a stream against the edge of the pattern. If there are undercuts, bend the wax out of them before attempting to remove the pattern. When the wax pattern comes away from the cast, replace it and gently readapt to the cast, except in the undercuts. Now attach the sprue at the anterior junction of the lingual waxed undercut. The sprue is a strip of twenty-gauge base-plate wax, about five-sixteenths inch wide. This supplies a sprue that will pass readily through the clay crucible when investing, and carries enough volume without the danger of the sagging of the metal. The sprue

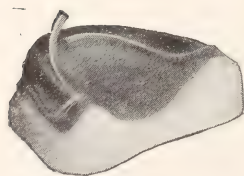


Fig. 1.

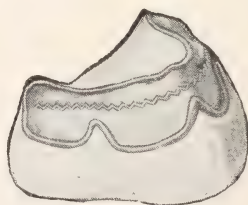


Fig. 2.

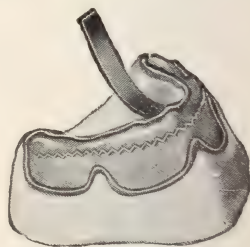


Fig. 3.

should be attached at an angle of forty-five degrees to the general level of the ridge, and pass backward over the vault. At a point three-quarter inches back from the place of attachment to the pattern, bend the sprue upward, perpendicular to the ridge, and the pattern is ready to invest. (*Fig. 3.*)

The production of a smooth surface on the casting is very desirable, and I find that this may be accomplished by the use of a painting investment compound put up by the Ransom & Randolph Co. This material is prepared for use by shaking the powder into water, allowing the water to take up the powder without stirring or spatulating. The proper consistency for the thin part of the mix is obtained by allowing a small portion of the water to remain unabsorbed at the edges of the mix. The mix may be prepared very handily on a watch-glass. For inlays a cement slab may be used, since only three to five drops of water are required.

The painting of wax patterns with a water-mixed investment has been a rather difficult thing to accomplish, because of the incompatibility of the water and wax. This, however, is obviated very pleasingly by the use of alcohol sprayed upon the wax pattern with an atomizer before attempting to paint. The alcohol wets the pattern, has an affinity for the water in the mixed investment, and carries the investment with it. The thinner part of the mix is applied with a brush, and then blown down with a chip-blower. There need be no care taken in its application except to see that the pattern is entirely covered. This results in a film coating covering the pattern, which is immediately covered by the thicker portion of the remainder of the mix, completely concealing the wax. (*Fig. 4.*)



Fig. 4.



Fig. 5.

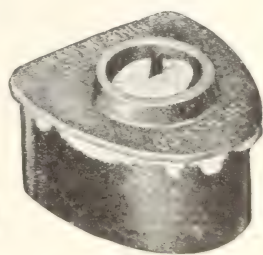


Fig. 6.

Each of the steps given is a preparation for the succeeding step; therefore, do not allow the alcohol to dry. Simply shake off the excess before applying the thin part of the mix. The film should be almost immediately followed by the thicker portion. This covering of painting investment is allowed to dry for about one minute, until it becomes a dull white, when it is covered by about an eighth-inch layer of Standard investment, to give sufficient strength for handling. A little of the Standard may be mixed the same as the painting

investment, to a thick, creamy consistency. This will not flow readily, but is pliable, and may be pushed about with a brush. The Standard investment will harden in about eight minutes, when the pattern may be removed from the cast (or model), and the painting investment, followed by the coat of Standard, also applied to the palatal surface in the manner just described, carrying the coating of Standard over the edges of the pattern, connecting it with the layer of Standard first applied, as directed. (*Fig. 5*) When this has hardened, the wax pattern is surrounded by a double envelope of investment which protects it from distortion during the process of investing it in the flask. The painting investment is very fine, which gives a beautifully smooth surface to the plate cast against it, making only the minimum amount of polishing necessary.

When the envelope has become hard, immerse the whole in water, together with a clay crucible. This is done for the same reason that we wet an impression before pouring a cast.

Sufficient Standard investment compound to complete the investing of the case is now mixed to a stiff-cream consistency in a large plaster-bowl. The inner perforated flask is placed in the outer cast-iron flask, and filled nearly full of the mixed investment. The invested pattern is now taken from the water, the palatal surface filled with the mixed investment, turned over and forced down into the filled flask until it is below the level of the top edge of the inner flask. The flask is then filled with the remaining mix to about an eighth inch above the top of the outer flask, and the cover placed in position, centering the sprue, and forced down. (*Fig. 6*).

The clay crucible is now passed over the projecting wax sprue, and rotated with the thumbs, as it is pressed down to position, the fingers pressing the flask-cover down, at the same time, until the grinding of the investment between the cover and flask can be heard. Hold in position for 3 to 5 seconds, then trim away the surplus investment material. (*Fig. 7*).

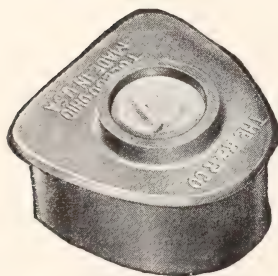


Fig. 7.



Fig. 8.

When using the flask on a pressure casting appliance, force the clay crucible about an eighth inch below the ring of metal to obtain ample space below the plunger-cover.

It may be well to speak of the correct mix of Standard investment at this time. When *and if* properly mixed, Standard investment will not shrink. If shrinkage appears, it is solely and entirely because the mix has been made too thin. In the thin mix the particles of the investment are held apart by the excess water. When this is driven off by heat, the spaces it occupies close up, causing the shrinkage. If the mix is carried to the consistency of very stiff cream, as before mentioned, the correct amount of water will be incorporated, and chemically speaking, Standard investment will be the result—not Standard investment *and* water; and the application of heat will have the effect intended—that of a slight expansion of the investment.

Be sure that the investment is mixed as directed, so that it will hang and drop from the spatula and form masses as shown in *Fig. 8*.

Standard investment reaches its maximum expansion in the chemical process of setting by the end of the first hour. It may therefore be allowed to stand any length of time thereafter without injury to the mold. Theoretically, by applying heat before the end of the first hour, we are adding heat to that already generated by the chemical process of setting, and thereby increasing the normal expansion of the investment.

The heating or drying-out of the flask should be conducted very slowly and considerably. During the first fifteen minutes the heat should not exceed 300° or 400° F. At the end of that time it may be gradually raised to about 700°, where it should remain until the flask and invested case are entirely dry, when it should be raised as rapidly as possible to about 1400°, and held there twenty to thirty minutes, or until a bright cherry red may be seen by looking down through the sprue opening. This is about the color of your neighbor's cigar when he is smoking gently. The dull cherry is too cold, and the white heat is too hot. In either case a failure is likely to follow an attempt to cast. If every step is carefully and correctly taken, failure will be almost impossible.

When the flask has attained this heat, clean the gold to be used on a charcoal block. Then take the flask from the furnace, rub the bottom ring on an asbestos board to clean it, and set it in place on the Elgin bedplate. To be sure of an air-tight connection, rotate the flask back and forth on the bedplate until a vibration is felt. Rotate gently, not violently, for the flask is very dry, and the mold may be injured by rough handling. As soon as vibration is felt, turn the flask very slightly backward—in the opposite direction to that in which it was moving when vibration is felt—and release it. An air-tight seal between the flask and bed-plate may be depended upon. If

vibration is not felt, remove the flask and rub the bottom of it gently on a piece of very fine emery-paper and try again.

By this time the cleaned gold will have cooled to a cherry-red, when it may be picked up with pliers and placed upon the clay crucible in the top of the flask. Play the blow-pipe flame upon the nugget until it reaches the proper molten state, and make the cast. Keep the flame playing on the bottom until the casting has had time to solidify. By keeping the residue of gold in the crucible in the molten state until the casting has congealed to some extent, the draw caused by the shrinking of the metal is downward. If the flame is removed from the bottom as soon as the casting is made, the button will cool first, since it is in contact with much cooler atmosphere, and the draw will be upward, toward the button, and might even extend to the casting and pull away a part of it.

There are two good ways of handling the plate at this stage. The flask may be allowed to cool, when the plate may be removed. If trial on the model indicates swaging to be necessary, the plate is annealed, swaged, and then retempered by heating to a dull cherry and allowed to cool very slowly.

The other method is to open the flask at once, cut the sprue while the plate is still cherry red, plunge the plate into water, at once annealing it. The plate is then tested and swaged if necessary, and the plate retempered.

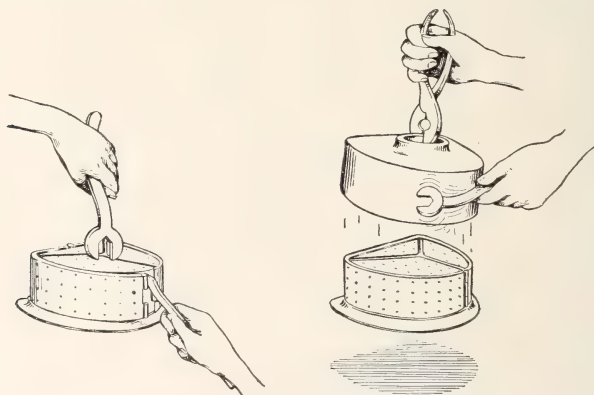


Fig. 9.

The flask may be opened by inverting it and tapping smartly on different sides of the outer flask. This breaks the seal of investment above the inner flask and the outer comes away. Draw the pin holding the joint of inner flask together, and force apart with a plaster knife. (*Fig. 9*). The investment may now be broken away from the casting. Expose the sprue by removing remaining investment and cut the casting free. Clean the investment away from the crucible, and tap it out of the cover. If the crucible is whole, it may be used again.

If broken, save the pieces, as they may contain some gold, and send them to the refinery with other scrap. The button may be removed by tapping on the cut sprue.

All of the foregoing has had to do with casting in gold. The Aluminum base-plate may also be cast in practically the same manner, with a few changes in technic, as follows:

In the preparation of the wax pattern, an eighteen or twenty gauge base-plate wax is advisable. The sprue should be double, or twice the thickness of that for gold, two strips of twenty-gauge wax being used.

The drying-out of the flask and the heating up may be done on a Bunsen or a Fisher burner, using about an inch and a half flame for the first fifteen minutes. The flask is placed above the burner in such position as to allow the upper half of the flame to enter the bottom opening. At the end of fifteen minutes, the flame is raised to about three and a half inches, and allowed to remain at that until the flask is dry. Then give it a full flame, of seven or eight inches until the flask stops smoking when the flame is turned down to the height first used and allowed to remain at that point for another half hour, when the flask is ready for the next step.

Place the dry flask on the bed-plate and test the seal as for gold-

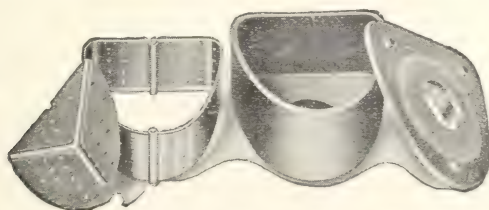
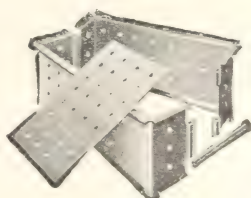


Fig. 10. The Moore Plate Flask.



Outer Flask.



Inner Flask.

Fig. 11. The Moore Saddle Flask.



Fig. 12. The Moore Inlay Ring.

casting. Place one-third to one-half ingot of aluminum in the crucible. A large brush-flame from the blowpipe is played upon the metal until it flattens out. Test it with some old instrument, such as a spoon excavator, by stirring it about. A feeling of resistance indicates that the metal is not yet fully molten. Continue playing the flame and testing until the resistance disappears, and then cast. The molten metal will not pass the color of bright aluminum in the daylight. By testing the condition of the molten aluminum in the manner suggested, metal will not become overheated, and the result will be a bright, clean base-plate, having the smooth characteristic feeling of aluminum.

It is well, perhaps, to describe to some extent the Moore Plate and Saddle Flasks and Inlay Rings. These flasks without a doubt are among the greatest improvements that have come to casting in the last few years. They are so constructed that there is a space surrounding the investment on all sides except the top. This is accomplished by using an inner perforated flask somewhat smaller than the outer flask, and with an outward-turned upper edge which prevents investment from passing downward into the space between the flasks. This space provides a lateral emptying of the air in the mold. It therefore gives us the ability to cast, "up hill." If metal may be made to flow up hill, it therefore can be cast "down hill" with an increased efficiency. The space is a great aid in eliminating the moisture as the flask is raised so it does not rest on the base. It also acts as an equalizer of the heat and as an insulator against the cooling of the atmosphere when the flask is placed on the casting.

The inner flask is provided with hinges having loose pins which enable one to remove the flask from the investment without the necessity of plunging it in water or cutting it out with a knife. (*Figs. 10, 11 and 12*).

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## The Relation Between Dental Infection and the Efficiency of the Worker

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THE following report was forwarded to ORAL HEALTH by Professor G. R. Anderson, who received it from Dr. H. L. Reazin, Acting Medical Superintendent for the Toronto Street Railway. Dr. Reazin, in his examinations, kept accurate record of mouth conditions, which he described as either having a condition of "pyorrhoea" or not, and drew the conclusion that dental infection interfered with the efficiency of the worker, prevented concentration upon the duty in hand, making him a "bungler" by getting his mind off his work and preventing proper control of his movements. Members of the profession will be interested to note the large percentage of accident cases with unhealthy mouth conditions as shown by the following records of all the cases coming under his care.

PYORRHEA.	NAME.	INJURY.
Yes.....	Vagus.....	Sprained ankle. His scaffolding fell.
? .....	Lamb.....	?
? .....	Sevinford.....	?
Yes.....	Pape.....	Pinched finger in fender, crushing finger.
No.....	Bowden.....	Burned by flas <sup>h</sup> flame from furnace door. Caused by another who closed draught.
Yes.....	Rowan.....	Froze heels on wire. (T.E.L.)
Yes.....	Sweetland.....	Let wheel fall on foot.
Yes.....	May.....	Electric flash burn.
Yes.....	Joy.....	Drove in front of car.
Yes.....	Leaver.....	Brake handle slipped from his hand, struck his arm.
Yes.....	Sutton.....	Turned waggon in front of car.
Yes.....	Briggs.....	Conductor. Hand caught in trolley rope.
Yes.....	Johnson.....	30 First Ave.
Yes.....	Hipgrave.....	Tripped and hurt knee ; five weeks disabled.
Yes.....	Tucker.....	Crushed hand at car door.
Yes.....	Moise.....	His tool slipped and cut his hand.
? .....	Babkin, Mrs.....	134 Church St.
Yes.....	Thayer.....	Motorman. Got his car in collision with another. His blame
Yes.....	Moul.....	Fell off a ladder.
Yes.....	Craig.....	Fell from Emergency Waggon.
Yes.....	Caulfield.....	Got off moving car. Injured.
Yes.....	Kidd.....	Conductor. Fell from his car.
Yes.....	Neish.....	Conductor. Fell getting off his car.
No.....	Castle (Mrs.).....	Thrown from her car. Collision. No trouble. Caused by another.
Yes.....	Graham.....	Derrick collapsed. Neurasthenia.
Yes.....	Rogers.....	} Burned by electric flash. Rogers caused it.
No.....	H Imus.....	
Yes.....	Miles.....	Sprained ankle getting off car.
Yes.....	Crawley.....	Fell into pit in car-barns.
Yes.....	Gray (Mrs.).....	Jolted in car. Neurasthenia
Yes.....	Mutch.....	Crushed finger.
Yes.....	Greenland.....	His car in collision.
Yes.....	Barton.....	} In compressed air hole at night. Put guard light down in hole to see. Run over by World newspaper van
Yes.....	Gardiner.....	
Yes.....	Botsford.....	Slipped off steps of car. Neurasthenia—extreme. (Cleared up immediately after extraction of teeth and vaccine.)
Yes.....	Baldwin.....	Electric switch closed on hand.
No.....	Sullivan.....	Tower upset. Caused by another. Fell 20 feet. At work in one week.
Yes.....	Weir.....	Crushed end off finger in door.
Yes.....	Filp.....	Piece of steel smashed his glasses. Caused by himself.
Yes.....	Stanner.....	Fell off his ladder. Fracture sprain ankle. Five weeks.
Yes.....	Johnson (Miss).....	Fell down in rear vestibule. Neurasthenia.
No.....	Drewett.....	Face badly cut by flying stick. Thrown by another.
Yes.....	Steinburg.....	Jumped off a moving car. Has had p. No teeth now. Tonsils bad.
Yes.....	Johnson.....	Electric flash burn. "Forgot " and fumbled.
No.....	Caulfield.....	Street car ran down his milk waggon. Caused by another. Was thrown over his horse's head. Laid up <u>one day</u>
Yes.....	Hallett.....	Conductor. Fell from his car.
Yes.....	Hurst.....	Trackman. Stood aside for car to pass. Did not clear. Knee crushed. Six months.
Yes.....	Smith.....	Conductor. Fell from his car.
Yes.....	Clarke.....	Carpenter T. R'y. Cut hand on circular saw.
Yes.....	Ineson.....	2146 Dundas W. Would put man off car. Nose broken.
Yes.....	Brown.....	Machine shop. Emery in eye.
No.....	Beatty.....	Finger off. Passenger on car in collision. Caused by another
Yes.....	Whitman.....	Paralyzed legs. Lifting.
Yes.....	McCorquodale.....	Fell, descending from scaffold.
No.....	Beresford-Howe.....	Concussion. Passenger on a car in collision. Caused by another.
Yes.....	Grant.....	Conductor on car in collision. Neurasthenia.
Yes.....	Bradley.....	Screwed bandsaw too tight. Broke. Cut face. p. + cigarettes + bad tonsils.
Yes.....	Blacken.....	Poked his head against a live wire.
Yes.....	Robertson.....	Foreman. His scaffolding fell. Arm hurt.
Yes.....	Joynson.....	Fell into pit in car-barns.
Yes.....	Manchester.....	Conductor. Brush burn by trolley rope. Cigarettes.
Yes.....	Winzell.....	Conductor. Fell from his car.
Yes.....	Templeton.....	Conductor. Fell from his car.
Yes.....	Dagleish.....	Conductor. Hurt his foot getting off car.
Yes.....	Hughes.....	Burnisher. Cut hand with hoopiron.
Yes.....	Anderson.....	Conductor. Fell from his car.
Yes.....	White.....	Shedman. Driving horse. Ripped finger off in traction chain.
Yes.....	Harris.....	Conductor. Fell from his car.
Yes.....	Swan.....	Conductor. Struck shin on step. Three stitches.
Yes.....	Noble.....	Put key in box on grounded pole. Shock
Yes.....	Stevenson.....	Tried to board a speeding car. Thrown.
No.....	Smith.....	Overhead service. Cutting out live wire. Bungled. Shock— fall. Broken arm.
Yes.....	Donald-George.....	Conductor. Dovercourt night car. Forgot and left switch open and Queen car smashed into his car. Neurasthenia.
Yes.....	Murray.....	Conductor. Struck by air hose. "Helping " motorman.
Yes.....	Ross, Mrs.....	Fell when boarding car. Neurasthenia.
Yes.....	Lavender, Mr.....	} Driver. Drove auto in front of car, Thrown out.
No.....	Lavender, Mrs.....	
No.....	Miss Duffy.....	

PYORRHEA.	NAME.	INJURY.
Yes.....	Gray.....	Conductor T.R'y. "Running hand along top of fence"—cut tendon.
Yes.....	Rice.....	Conductor T.R'y. Fell from his car.
Yes.....	Evoy.....	Flash burn. Although switch was not right, "thought 'twould do."
Yes.....	Neish.....	Leaned from car. Struck head on post.
Yes.....	Patterson.....	Shoulder dislocated by trolley rope.
Yes.....	Pearson.....	252 Lansdowne. Chewing grass. Grass blade in duct lingual gland? Abscess.
Yes.....	Skingle.....	Fell from car.
Yes.....	Munson, Miss.....	Fell from car step. Neurasthenia.
Yes.....	Mecham.....	Complains he is getting nervous on cars.
Yes.....	Brothers.....	Pinched finger in trolley rope.
Yes.....	Swan.....	Leaned from car. Struck head on post.
Yes.....	Cowan.....	Injured when his trolley pole came out.
Yes.....	Ronaldson.....	Ran his car into another. Says 'twas his fault—that he went where he had no right.
Yes.....	Hiltz.....	Wounded his hand with water glass.
Yes.....	Neshitt.....	Emery in eye.
Yes.....	Wright.....	Working overhead in subway. Fell to ground.
Yes.....	Taylor.....	Conductor. Fell off his car.
?.....	Bartle.....	Passenger on car in collision, cut by glass. Mouth not examined.
Yes.....	Frazer.....	Motorman. Struck by escaped air hose.
?.....	Campbell.....	Hand burned by trolley rope. Mouth not examined.
Yes.....	Rland.....	Overheadman. Tangled wires and got burned.
Yes.....	Hawkins.....	Motorman. Had his car in collision.
?.....	Coutts.....	Fixing batteries. Dirt in eye. Mouth not examined.
No.....	Clark.....	Struck on leg by air hose.
Yes.....	Hill.....	Hand torn on car.
Yes.....	Rowes.....	Driver.....
No.....	Hagen.....	Roy riding.....
Yes.....	Trueman.....	Conductor. Fell from his car.
Yes.....	Wilmott.....	Struck on leg by air hose.
Yes.....	Strickland.....	Hurt ribs putting up fender.
Yes.....	Edgar.....	Conductor T.R'y. Neurasthenia. Fell from runningboard of his car. Threw up hands with a cry and fell.
Yes.....	Gault.....	80 Sheraton. Was erecting a pole which fell—cutting his head.
Yes.....	Gurr, Mrs.....	Fell when alighting from a car.
Yes.....	DeWitt, Mrs.....	Collision. Neurasthenia.
Yes.....	Garbe.....	Engineer. Finger crushed in machinery.
Yes.....	McPhillips.....	Motorman, T.R'y. Struck by air hose.
Yes.....	Cowan.....	Caught finger in machinery.
Yes.....	Donnelly.....	Conductor, T.R'y. Fell boarding moving car.
Yes.....	Timms.....	Motorman. Hand brake escaped and struck him on belly.
Yes.....	Perry.....	Motorman. Drove his car into collision with another ahead.
No.....	Corking.....	Head cut in collision. Bad tonsils. No nasal passage.
Yes.....	Gubbins.....	Brush burn by trolley rope.
Yes.....	Ralston.....	Swung out of car. Struck a post in passing.
No.....	Woodrough.....	A boy—drunk—bicycle and car and auto mixup.
Yes.....	Robinson.....	Flash burn.
Yes.....	Ewers.....	Finger in circular saw.
Yes.....	Pogue.....	Sprained ankle leaving car.
Yes.....	Bird.....	Plank fell from his scaffold onto his head.
Yes.....	Evans.....	His tackle block fixture gave way, fell with motor, T.F.L.
Yes.....	Dawson.....	Could not manage horse. Jammed between wagon and wall.
Yes.....	Newson.....	Slipped off moving car.
Yes.....	Frost.....	Conductor. Fell from his car.
Yes.....	Swankie.....	Collision. Failed to connect trailer properly.
Yes.....	Winter.....	Motorman. Pain in back from driving car.
Yes.....	Frith.....	Conductor. Brush burn by trolley rope.
Yes.....	Ellwood.....	Fell off car. Fracture wrist.
Yes.....	Cox.....	Conductor. Brush burn by trolley rope.
Yes.....	Walmsley.....	Electric burn. Operator Power Stn. "Doesn't know" how he did it.
Yes.....	Martin.....	Pinched finger in machine.
Yes.....	Hall.....	Stepped in front of automobile. Bruised elbow.
Yes.....	Wallace.....	Fell getting on car.
Yes.....	McKenzie.....	Fell into sewer.
Yes.....	Kenney.....	Cranking car. Fracture wrist.
Yes.....	Milne.....	Conductor. Fell off trailer.
Yes.....	Doyle.....	Cold chisel he was using struck him in the eye.
Yes.....	Giddings.....	His wagon struck by car. Thrown out.
No.....	Lloyd.....	Emery in eye. No p. but badly diseased tonsils.
Yes ?.....	Dowden, Mrs.....	Got off moving car. No teeth. Tonsils badly diseased.
Yes.....	Sprot.....	Conductor. Put his hand through window glass.
No ?.....	Mulcahey.....	Motorman. Slight shock. Sprained muscle.
Yes.....	Harris.....	Put hand through window. Conductor T.R'y.
Yes.....	Collinson.....	Motorman. His car in collision.
Yes.....	Robinson.....	In car—passenger—car struck in collision. Not hurt but frightened. Neurasthenia.
?.....	Marks.....	Ankle broken. No note on mouth condition.
Yes.....	Foulds.....	Car in collision. Sprained wrist.
Yes.....	Watt.....	Struck on cheek by hammer.
Yes.....	Stanner.....	Face burned by furnace blast.
Yes.....	Wear.....	Squeezed in the crowd in accident. Pain in chest next day.
No.....	Siegel.....	Thrown out of rig.
No.....	Peebles.....	Struck on eye by flying nut.



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## MARITIME PROVINCES.

THE Western Counties Dental Association of Nova Scotia was organized at Weymouth recently. The following officers were elected for the coming year: Hon. Pres., Dr. Harding, Yarmouth; Pres., Dr. Hogan, Weymouth; Vice-Pres., Dr. Anderson, Bridgetown; Sec., Dr. Merrill, Yarmouth; Exec. Comm., Dr. McGregor, Digby; Dr. Roop, Bear River; Dr. H. Harding, Yarmouth.

Meetings of the Society are to be held semi-annually, the next meeting to be in June. The purpose of the Society is co-operation among the members, with the best of service to the public generally.

\* \* \* \* \*

The annual meeting of the Halifax Dental Society was held on the 30th of October. The following officers were elected for the coming winter: Pres., Dr. J. H. Rice; Vice-Pres., Dr. H. S. Crosby; Sec.-Treas., Dr. J. Stanley Bagnall; Property Officer, Dr. F. W. Ryan. To complete Exec., Dr. E. S. Millet.

Two new members, Dr. W. L. Fluck and Dr. F. W. Johnson, were enrolled.

The various annual reports were read and plans made for regular monthly meetings during the winter months. The study club plan was discussed, but it was decided that the most suitable plan would be along the lines of a journal club. Three members are to be selected each evening. These will give digests of recent literature on lines in which they are interested, and it is hoped that this will give rise to general discussion on problems arising in the articles.

The meeting was held, at the invitation of Dr. J. R. Rice, at the Shelldrake Rod and Gun Club. It was planned to make the evening largely a social one, and after the business was concluded, the members adjourned to the lounge. The bridge players soon emerged, but a group over in one corner entered into a lively discussion, and from the occasional remarks on veneers, etc., which floated out, it sounded

very much like "shop". After all, one of the chief functions of a dental society is to know our colleagues better, and what more fruitful way is there of bringing this about than by a discussion of our common problems?

\* \* \* \* \*

The annual meeting of the Prince Edward Island Dental Association was held a short time ago. The following officers were elected for the coming year: Pres., Dr. F. E. Smallwood; Vice-Pres., Dr. W. L. McLellan; Sec.-Registrar, Dr. J. S. Bagnall; to complete the Council, Drs. J. H. Ayers and A. W. Lockhart.

\* \* \* \* \*

A Club which was recently formed in Dalhousie University, while not strictly a dental society, has a very close connection with the practising dentist. It consists of the full-time members of the teaching staffs of the Faculties of Medicine and Dentistry as full members, and the part-time instructors as honorary members. The Club meets once a week to discuss the educational problems which jointly affect both professions. The first paper read before the Club was on "The Need of a Closer Relation between Medical and Dental Studies", and this problem was considered from the dental standpoint.

\* \* \* \* \*

The following interesting paragraph appears in the Annual Calendar of the Provincial Normal College of Nova Scotia for the session of 1923-24:

"A course of lectures in Public Health was provided by the Provincial Health Department, the instruction being given by Drs. Hattie, Jost and Chisholm. This was supplemented by health lectures given by Miss Flora Liggett of the Provincial Red Cross Society, and by addresses on Oral Hygiene and Preventive Dentistry given by Dr. Craig of the Canadian Dental Association and C. S. McArthur, D.D.S. of Truro, whose services were voluntary and gratis."

Dr. McArthur's name appears on the Faculty list as Lecturer in Oral Hygiene. The following is also quoted from this calendar: "The Maritime (Nova Scotia) Dental Association, and especially its energetic and public spirited member, Dr. George K. Thomson, of Halifax, must be credited with initiating this movement in the Normal College."

—J. S. B.

## ONTARIO.

### HAMILTON ACADEMY OF DENTISTRY.

THE opening meeting was held at the Royal Connaught Hotel on Friday, Oct. 19th. Forty members were present and sat down to dinner at 6.30.

After the dinner a short business session was held, with the Past President, Dr. W. G. Thompson, in the chair.

It was decided to have two "Study Clubs", one on "Conductive Anaesthesia," and one on "Cavity Preparation and Gold Inlay Technique." These Clubs will meet in the near future and elect officers and arrange the work for the season.

The officers of the Academy for the present year are: President, Dr. O. S. Clappison; Vice President, Dr. R. N. Berry, M.L.A.; Past President, Dr. W. G. Thompson; Secretary, Dr. H. L. Field; Treasurer, Dr. A. R. Poag.

The President then introduced the speaker of the evening, Dr. C. K. Bird of St. Paul, Minn., who gave a very interesting paper, "The Reasons for and Technique for Balanced Occlusal in Fixed Reconstruction."

The paper was augmented by a very fine collection of slides, and showed clearly the application of the Monson Principle as applied to this important work.

On Saturday, Dr. Bird gave a table clinic on this work, presenting models of finished and unfinished cases, showing the steps taken and the improvement shown in actual cases. Dr. Bird clearly explained the Monson Articulator and the steps taken in taking the bite and checking for accuracy.

—W. G. T.

### MANITOBA.

THE officers of the Winnipeg Dental Society for season of 1923-4 are as follows:—Dr. A. E. Clint, Pres.; Dr. D. A. McCarten, Vice-Pres.; Dr. H. W. Mitchell, Sec.-Treas. The first meeting was held Nov. 13th at the Fort Garry Hotel. The chief business was an excellent paper by Dr. H. J. Merkley, on the general relation of teeth to focal infection, and the introduction of several new members.

\* \* \* \*

During 1923 there have been 17 new licenses issued in Manitoba, and 1 permit, making a total of 197 registered dentists in the province. The Registrar's report shows all dues paid.

\* \* \* \*

The following are some of the new dentists who have located in Manitoba (mostly Winnipeg) this year: Drs. C. D. McLeod, J. Willis McLeod, C. McLeod, P. E. LaFleche, H. J. Lawerance, Elsey, Wallace, Riley, McMillan, McKenzie, and Dr. Truman, of Saskatchewan, who took over Dr. Hallister's practice; Dr. Weir, of Dauphin, Man., moved into Winnipeg and bought out J. Lee Rogers.

\* \* \* \*

Dr. J. M. Rogers, a confirmed bachelor of many summers and many more winters, was married on December 1st, in Ontario. He has sold his practice in Winnipeg, and is moving to California.

Dr. Walker has returned from his experiment at Victoria, B.C., and resumed practice in his former office at Dauphin.

\* \* \* \*

It is said that a man's real character shows up under difficulties. The present depression has caused one or two of our members to break into advertising their wonderful virtues.

\* \* \* \*

Dr. Douglas Brown won the Ash-Temple cup, thus closing a very pleasant season among our golf enthusiasts.

\* \* \* \*

The following were among those who attended the Overseas Officers' dinner at the Marlborough Hotel on Nov. 10th., when about 400 were present: D. P. Stratton, H. C. Hodgson, N. S. Bailey, W. R. Morrison, W. W. Wright.

\* \* \* \*

During the annual meeting of the Manitoba Dental Association, considerable criticism was voiced regarding the inferiority of many Tooth brushes now on the market, particularly of Japanese manufacture. A resolution suggesting that, unless the quality of the brush was strictly maintained, the association withdraw their recommendation of the brush, was unanimously passed.

W. W. W.

## Plaster of Paris and Vulcanite Repairs

AS is well known, a vulcanite plate moulded on a plaster of paris cast, and invested in the same material, is very liable to change shape by its efforts to contract in cooling. It is not so well known that this first contraction is not its last, but that if it is revulcanized it may contract again. Vulcanite contraction, if uncontrolled, continues in lessening degree through four or five heatings at 320° F. This fact makes it important that in vulcanite repairs the plate be invested in a plaster which does not soften unduly during vulcanization. Especially is this true if it is a "rush" job, as most repairs are, wanted the same day, little time being afforded for the plaster of paris to harden. All the slow-setting plasters retain their firmness during vulcanization, but as they require four or five hours in which to set they are not suitable for speed. Of the quick-setting hard plasters those which contain some Portland cement (which has an affinity for water) best retain their hardness in the vulcanizer. It is the more important that this investing in hard plaster be done if the plate was originally made on a hard-setting plaster, for in such case it then had no contraction and (if the impression was correct) was a good fit. If such a plate is afterwards repaired in plaster of paris and thereby loses adaptation, results are lamentable.—STEWART J. SPENCE, D.D.S. (*Dental Digest*, September, 1923).

# THE COMPENDIUM

This Department is Edited by  
THOMAS COWLING, B.A., D.D.S., Toronto

A SYNOPSIS OF CURRENT LITERATURE RELATING  
TO THE SCIENCE AND PRACTICE OF DENTISTRY

## THE PROPERTIES AND FUNCTIONS OF SALIVA.

THE question of the constituents of normal saliva is of paramount importance to every dentist and in keeping with its importance many and varied opinions have been published.

In the "Dental Cosmos" a paper is published setting forth the results of Dr. Joseph H. Kauffmann's researches. This article presents in a very concise form the latest views regarding this important question.

The terms "acidity" and "alkalinity," as referred to saliva, have been used rather loosely. It is not a case of dealing with test tubes of stable compounds, but with changing tissue cells, differing secretions and concretions, multiple flora of pathogenic and non-pathogenic micro-organisms, the variable status of which may be influenced by either local or systemic agencies, or both.

Acidity of body fluid, according to the present conception of physiological chemists, is that condition in which the free hydrogen ions are in sufficient concentration to cause an acid reaction. Alkalinity denotes the opposite, or that chemical reaction resulting from a predominating concentration of free basic ions. It is not sufficient to determine the acidity or alkalinity of saliva simply by moistening litmus paper. In the light of modern chemical researches such a test is almost useless.

By "saliva" we mean all of the secretions which are conglomerated in the mouth—the emanations from the various glands. Normal mixed saliva is of alkaline reaction, although when the flow is scanty, or after eating, it may be slightly acid, due to excess of carbonic acid. It has a specific gravity of 1.002 to 1.006 and is composed of about 99.5 per cent. water and 0.5 per cent. of solids. The daily secretion averages about three pints and is greater during the day than at night.

Among the solids is found a trace of potassium sulphocyanate about which a great deal has been said. It has been claimed for this

salt that it was a preventive of dental caries. Of this, however, there is little or no experimental proof.

The chief functions of saliva are:—To moisten and soften the food; to act as a lubricant to the mucous membrane; to assist in ejecting undesirable or foreign bodies; to act as a mechanical aid in prophylaxis by washing away food remnants from crevices, pits, and cavities in or about the teeth; to act as a physical guide in thirst, hunger, etc.; to assist in giving the normal epithelial lining of the mouth a high degree of resistance; to act as a solvent of food substances.

Viewed from the biochemical standpoint: An alkaline saliva is conducive to the maximum activity of the amylolytic ferment, ptyalin, which is usually the only digestive juice present in the mouth. This forms dextrose and maltose which are simple sugars, from starch and complex sugars.

An alkaline saliva may dissolve such minerals as are soluble in an alkaline medium; on fats it may produce a feeble emulsion; on proteids its alkaline reaction helps to soften the muscle bundles of meat; it assists in a diminution of zymogenic micro-organisms, many of which are acidophilic in nature; it tends to prevent the accumulation of saprophytic products, arising from the decomposition of carbohydrate food; it produces a deposit of salivary calculus upon the teeth because of the precipitation of calcium salts; it dissolves mucin secreted by salivary and mucous glands; it is indicative frequently of the corresponding alkalinity of the blood.

Dr. Kauffmann is of the opinion "that the saliva is a potentially indicative fluid holding a horde of unsolved possibilities which will be more fully appreciated when developed by further study." It should not be looked upon as merely saliva, but as a fluid derivative of the blood which may hold properties normal and abnormal that are present in the mother fluid.

It may be shown "that normal saliva is usually, though not necessarily, alkaline, and conversely acidity would denote usually, but not always, a pathological state, or at least a deviation from the normal. As a means of having a standard at hand, we should bear this in mind when we are treating conditions under which saliva may become acid in reaction, absolutely or relatively, particularly where such variation may be corrected by the dentist."



## A Rainy Day

I N common with my love of nature in all her moods, I love a rainy day. There is something so restful about it. The sun is subdued, and nature droops a bit. It is quieting to the nerves, and refreshing to the mind. After the hot, dry, parching, dusty days, the relief is unspeakable. It brings comfort and content to the souls and bodies of men, and it is manna to the thirsty birds and beasts. The hungry earth drinks in the cooling draught, and the blades of grass perk up their tiny heads. The waterfowls shake themselves after the glorious bath. Little rivulets run down the sides of the horses and cows—washing them clean, and glistening their coats. The frogs root in the softened earth with grunting content, and fishworms crawl across the path. The boughs hang low—laden with their crystal load, and the heavy heads of grain bend toward the earth. The middle of the road looks white, and the splash, splash of the horses' feet beat time in the softened ooze. Now and then a hoof will slip, leaving a tangent streak in the mud.

The pestering flies are driven into retreat, and hang shamefacedly in every sheltered nook. The eye can sweep the heavens without the sunlight glare, and the leaden sky broods over the earth with moody mien. The air stirs gently in the forest fringe, and the leaves shed copious showers. The barnyard chanticleer looks bedraggled but undaunted, while the subdued hens huddle in the shed. The dog shakes himself like a shaggy wolf, and the cat creeps in by the kitchen stove. Every living thing seems to be in a sober and reflective mood, and it is a quiet day of rest. The cosy corner by the fire beckons to us, and we readily yield to the subtle allurements.

And yet there is a temptation to be out in the rain and mingling with the elements. Whether it comes in a gentle drizzle or in tempestuous sheets beaten by the wind, there is a glory in battling with it. To plunge around through the dripping woods, or across the reeking meadows, or up the slippery slopes—to keep going till the blood tingles and the breath comes rapidly and the perspiration starts—that is living. One can understand the impulse that caused the great

mountain naturalist, John Muir, to go out in a beating rainstorm and climb a tall tree to watch the warring of the elements.

And to lie under the rafters at night and listen to the rhythmic patter of the raindrops on the shingles overhead—there is no music equal to it,—nothing that lulls the tired brain and body as does this. We curl closer under the bedclothes, and snuggle securely to rest. We are protected from intrusion by this wondrous wall that man has built for his comfort. Think of the devices that men have originated to shield them from the rude grasp of the elements—all the fine houses for themselves, and the staunch barns for their animals—it is marvellous in its ingenuity. From the cave man crawling into some clefts in the rock, and disputing every inch of his way with the wild beasts, down to the modern dwelling with its manifold comforts and miraculous conveniences—down this long and weary way, man has travelled to his increased comfort.

A rainy day has no terrors for us if we wish to keep away from it. We can remain indoors and let it rain. There are numerous small duties that we should do indoors—many little jobs that have waited long for this opportunity. We can go into the workshop and repair the articles broken in busier times. We can make some new convenience for the housewife. We can put our desk in better order. We can write and think. In fact there are not enough rainy days to do all the indoor jobs that should be done—many of them must be done in the evenings when we should be playing with the family. We stop to take breath on a rainy day, we relax and stretch ourselves, and renew our energies. We gather up strength for the coming days when we must go out in the fields, or to the factories, or to the counting house.

And then the memories of the rainy days of youth—when we sat in the shed and whittled, and looked out at the dripping eaves—when we went whistling down in the pasture lot for the drenched cows and drove them up to the barnyard bars—marching in slowly measured tread, till they bolted with a rush into their waiting stalls. And other memories of youth—memories of bright eyes, and merry peals of laughter—memories of whispered confidences, and pledges of eternal constancy—memories of young hearts beating high with hope, and joy, and the blessed light of love. And other memories—memories of the one who rocked the cradle, and watched over us through the fleeting years, up from babyhood to the boisterous boyish days, whose heart went out with us into the great wide world, and whose living thought of us never ceased till she was called quietly away to sleep peacefully in the little white village on the hill. Ah! the memories—the blessed memories of the rainy days.

*C. H. Johnson*

# ORAL HEALTH

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## EDITORIAL

### Dental Infections, Oral and Systemic

D R. WESTON A. PRICE has recently edited a two volume work upon the subject of Dental Infections, Oral and Systemic.

The first volume presents in great detail researches upon the fundamentals involved, and the second researches upon the many and varied clinical expressions of dental infections. Attention is drawn to the frequent misapprehensions and misconceptions of both dental and medical practitioners regarding infection about the teeth and surrounding parts. These the author claims have arisen chiefly because of a presupposition that the quantity and virulence of the organism determined in large part the danger of the host, and that comfort and serviceability were synonymous with safety and efficiency. Upon this erroneous fundamental conception it has been presumed that a large *quantity* of dental infection would do harm, whereas a small quantity would not.

The author, at the very outset, clearly sets forth that an essential factor in these cases is the individual's capacity for reaction, and that the person with the large quantity of pus, as evidenced by the flowing fistulæ, did not necessarily have more infection, but rather a difference in defence and the establishment and maintenance of a local and systemic quarantine. The lack of reaction about the tooth, and the resulting comfort, might only mean that the "quarantine" was not

in operation, and that toxin and bacterial invasion were passing to other parts of the body, there to break down tissues and shorten life.

Dr. Price also urges the view that the degenerative processes which we have thought of as various diseases, such as Bright's disease, heart disease, nervous system involvement, digestive tract disfunction, etc., are primarily the end products of disturbed processes of anabolism and catabolism, and that an important factor in disfunction will be found to be focal infection, whether of dental or other origin.

The two volumes are well written in readable style, and are submitted by the author as evidence (obtained through clinical and animal experimentation, extending over a period of twenty-five years, and conducted by himself and many collaborators), that focal infections are important contributing factors to many local and systemic lesions.

The vivisectionist will be pained to learn that Dr. Price's researches have required the use of upwards of five hundred rabbits a year for several years, but ought to be reassured by the statement that "many of these rabbits made a far greater individual contribution and service to the welfare of humanity than hosts of human beings," and that "rabbits that run wild and are chased by their enemies have not been as well fed and as happily housed, or been privileged to die under chloroform." Rabbits, like human beings, do not always appreciate their many privileges.

The many friends of Dr. Price, who have always admired his unbounded energy and enthusiasm, and who have followed his work with great interest, will welcome the publication of these two interesting volumes.

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## Apply the Golden Rule

ONE hears much regarding codes of morals and ethics in these days, but after all, no "code", however carefully or cunningly contrived, will regenerate the man who is immoral or unethical at heart.

The dentist or other human being who has arrived at years of discretion, who has to be guided at every step by authority and instruction, is a mental and moral defective whom no code of ethics, however comprehensive, can save from his own folly or wrong doing.

Moreover, if a man gives out his thinking, instead of trying to do it for himself, he is an intellectual pauper who counts as a dead weight in the body politic. In so far as dental codes of ethics are rules of etiquette, they serve a useful purpose, but in the true sense it is impossible to codify conduct in the practice of any profession.

Let the principles of honesty prevail. With the application of the Golden Rule, and the exercise of courtesy between professional confreres, questions of ethics would be a thing of the past.











